ELECTRICAL WEST

July 1949
25 cents

A Lesson in Economics, Page 57
Appliances, Page 78

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

Sure, it's cold in summer, in some places—and it's better that way. That's why Edison advertisements are currently featuring electric home freezers.

Here's the way it works: Your customers will be glad they bought electric home freezers, when they can enjoy fresh fruits and vegetables out of season—but that will be next fall and winter, chiefly. On the other hand, it is important to sell them on freezers *now*, when full stocks of food at lower prices will give them all the advantages.

Strange as it sounds, it's good business to make "cold" sales to customers while they're hot!

SOUTHERN CALIFORNIA EDISON COMPANY

what's new in street lighting

Better Seal... Simpler Mounting

FOR OPTICAL ASSEMBLIES OF LARGE LUMINAIRES

Mr. A. G. Ottenheimer, General Electric Lighting Specialist of Chicago shows how new casing clamps hook over lugs of standard Form 101 hood.

Now General Electric engineers offer a new way to mount the large "A" type casings to Form 79 and 101 hoods. An external clamp hooks onto existing lugs on the outside of the hood. You simply hang the casing in place—lock it there by tightening the clamp screws.

This is only one more step in General Electric's efforts to help you achieve complete interchangeability and standardization of equipment. And, at the same time, it offers the benefits of better sealing, easier wiring, simpler mounting, and simpler assembly.

Here are some of the advantages:

1 Better Seal—Tightening the clamp screws compresses a cork gasket—makes a far better seal between hood and casing.

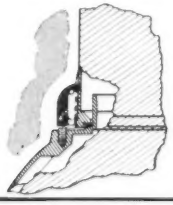
2 Easier Wiring—Casing and hood are shipped unassembled. All wiring is done *before* casing is attached.

3 Standardization—The same hood that has been used with standard utilitarian reflectors can now be used for Type A optical assemblies without drilling of holes or any other alterations.

4 Improved Appearance—Trim die-cast aluminum clamps cover the lugs on the hood.

5 And of Course, Much Simpler Assembly—No small parts to handle—clamps are loosened, not disassembled. No hidden holes to find. No balancing act—casing can be hung on hood and screws tightened later.

This new G-E clamp assembly is another of the many improvements General Electric has developed for better street lighting. For complete details call your Apparatus Office or write *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



Clamp, which is now used to mount Type "A" casings, is of die-cast aluminum, so shaped that it slips over and hooks onto lug on hood. Elongated screw holes in its base permit it to be moved toward or away from hood. With clamp backed away, casing is fitted against hood. Clamp moved in, it supports casing. Tightening the two screws locks clamp in place, draws casing with its cork gasket against hood.

Are you tying in with the NEMA plan to give America better street lighting?

GENERAL ELECTRIC

402-87

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

JULY 1949

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright, Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
James H. McGraw, Jr., Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — R. A. Balzari, Publishing Counselor
John W. Otterson, Manager — John Cootz, Typography

NEXT MONTH

Leading off will be a piece by R. G. Kenyon, entitled, "What's It Worth," in which the author says that the various things done for personnel under industrial relations programs should be measured by their worth to the company as well as their value to the employee.

Of interest to utility engineers will be an article on the new six-nozzle impulse water wheels at the Bridge River plant in British Columbia. Also of special interest to utilities of the West is the use of microwave channels for communication. R. G. Maddox will have an article discussing pulse time modulated microwave communication systems. The second article on preventive maintenance and a picture story on a new cable reel carrier will be other engineering features.

An article describing an infrared comfort heating installation will tell of a new application with great potentialities. The first of several new service requirements standards compiled by an industry joint committee of southern California will be published along with the power factor and industrial heating data sheets. In the sales section will be a report of the home economists' convention in San Francisco besides the sales guide and the informative news letter.

In addition, there will be the regular features—news, associations, profiles of interesting personalities of the month.

CONTENTS

More Production Means More Purchasing Power by Stanley M. Johns 57

ENGINEERING

Last Word in Insulator Washing by C. W. Sanders . . 60
Preventive Maintenance—I by H. Burns Colby 62
Historic Colgate Plant Rebuilt 64
FCC Assigns New Frequencies 66

LIGHTING AND WIRING

Labor Pains at District 6 NECA Meet 67
Fluorescent Roadway Lighting 70
Low Power Factor in Industrial Plants—VIII by W. C. King 72

SALES

New Things Sprung at L. A. Home Show 79
Dealer Net Profit in a Squeeze 80

PCEA

PCEA Convention Appraises Change 87

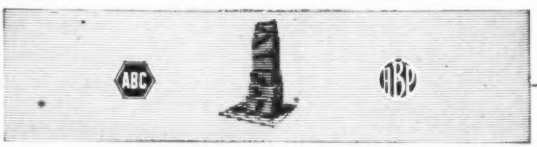
DEPARTMENTS

Associations	75	New Products	38
Books	35	News	116
Bulletins	52	Northwest Data Sheets	73
Editorials	76	Sales Guide	81
Electra's Husband	54	Sales Guide News Letter	83

COVER PHOTO: Washing Insulators on Southern California Edison Lines.

ADVERTISING REPRESENTATIVES

Chicago (11) — Philip S. Griffin, 520 N. Michigan Ave.
Cleveland (15) — Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (14) — W. D. Lanier, 621 S. Hope St., MI. 3691
New York (18) — John P. Eichorn, 330 W. 42nd St.
San Francisco (4) — Tom Carmody, 68 Post St., DO. 2-4600



THE ELECTRICAL WEST EDITORIAL ADVISORY BOARD

UTILITIES: N. R. Sutherland, Vice-President and Assistant General Manager, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President and Commercial Manager, the California Oregon Power Company, Medford; Frank McLaughlin, President, Puget Sound Power & Light Co., Seattle; J. H. Polhemus, President, Portland General Electric Company; W. C. Mullendore, President, Southern California Edison Company Ltd., Los Angeles; MANUFACTURERS: J. H. Pengilly, Executive Vice-President, Square D Company, Los Angeles; C. A. Dostal, Vice-President, Westinghouse Electric Corporation; A. S. Moody, Vice-President, General Electric Company, Portland; WHOLESALERS: A. H. Meyer, Leo J. Meyberg Co., San Francisco and Los Angeles; Harry C. Gerster, District Manager, General Electric Supply Corp., Los Angeles; CONTRACTORS: Teo L. Rosenberg, T. L. Rosenberg Co., Oakland; R. D. Horning, manager, Seattle Electrical Contractors Assn.; DEALERS: K. L. Hampton, manager, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Sec'y Mgr., Bureau of Radio and Electrical Appliances, San Diego, California.

VOL. 103 NO. 1

ELECTRICAL WEST (with which is consolidated The Journal of Electricity). July, 1949. Vol. 103, No. 1. Published monthly by McGraw-Hill Co. of Calif. Price 25 cents a copy. Publication office, 621 So. Hope St., Los Angeles 14, Calif. Executive, Editorial and Circulation offices, Electrical West, 68 Post St., San Francisco 4, Calif. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the Act of March 3, 1879. Printed in U. S. A. Subscription rates—U. S., U. S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Copyright, 1949, McGraw-Hill Company of California. All rights reserved.

L-M Engineers give you this

FUSE CUTOUT BUYER'S GUIDE

and a good example—the

L-M "PVD"

L-M designed the first wet-process porcelain cutout box on the market—more than 20 years ago, and has been the leader in fuse cutout development. Here, according to L-M engineers, is what it takes to *make a good* fuse cutout.

A cutout must keep itself *cool and dry*, so as to keep oxidation and deterioration of the cartridge to a minimum. Openings and leads should keep out rain so the cutout stays dry inside.

Contacts and contact areas should be large, with ample current carrying capacity, and preferably silver-plated. There should be a minimum number of electrical joints.

The cutout should have generous electrical clearance and creepage distances.

For ample rupturing capacity, the cutout should have free venting and a strong tube; and the tube should be securely anchored against recoil.

In a drop-out cutout, link parts should be well separated before the tube drops, so that the arc is cleared in the tube.

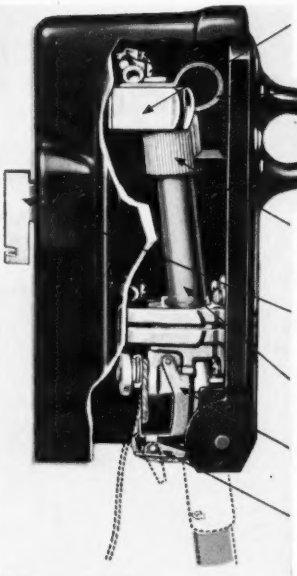
It is desirable to pull link parts straight out, as friction around the end of the tube will slow up the action.

Finally, the cutout must be simple to install. Re-fusing should be simple, and easy, even with gloved hands, to keep outages at a minimum.

GET THIS BULLETIN!

Quick reference to principal L-M open and closed cutouts; ratings, sizes, hangers. Ask the L-M Field Engineer for a copy or write **Line Material Co., Milwaukee 1, Wisconsin.**

DETAILS SHOW HOW "PVD" BENEFITS USERS



Large upper and lower contacts stay cool. Heavy reinforced silver-plated copper U straps; large contact areas.

Vertical Contact Spring: spring-tempered Monel, with silver-plated copper shunt; this spring helps push tube down, follows it part way to give extra clearing time; acts as top recoil absorber.

Large Knurled Cap, silvered, clamps fuse link button firmly into upper cartridge-ferrule. Easy to grasp for re-fusing.

Bracket Stud firmly cemented into the porcelain, not bolted through, to prevent corona and radio noise.

Heavy "Bakelined" Tube: the Bakelite prevents warping; the fibre lining extinguishes the arc.

Latching Lever holds tube in place; tube *cannot* drop till after link has been flipped out of the tube.

Link Flipper and Spring: puts only 4 pounds pull on link. When link blows, flipper pulls it straight down out of tube—especially important in interrupting light fault currents. When flipper is down (dotted line) it releases latching lever, permitting tube to drop.

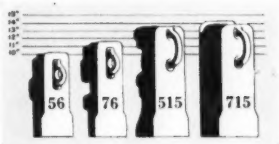
It signals: the tube is coated with canary yellow plastic; when it drops it is easily seen from the ground—saves "hunting".

DOOR STAYS CLOSED

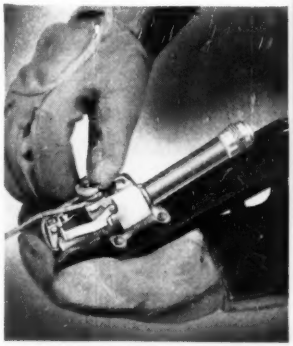
"PVD" is the original drop-out cutout on which the door stays closed, even after the link blows. This keeps out rain and sleet; the current carrying parts and the inside of the box stay dry, which prevents internal flashover. What's more, sleet on the door does not affect the drop-out operation of the "PVD".

"PVD" FAMILY PORTRAIT

"PVD's" meet (nearly) all distribution requirements for closed cutouts.



The 50 amp "PVD'S"	The 100 amp "PVD'S"
"PVD" 56 5 kv, 10⅛" high	"PVD" 515 5 kv, 13¾" high
"PVD" 76 7.5 kv, 11⅜" high	"PVD" 715 7.5 kv, 14¼" high



ONE MINUTE RE-FUSING

Door is unhooked and re-fused in 60 seconds or less. Big knurled knobs, easy to handle even with gloves.

Or 6-second re-fusing

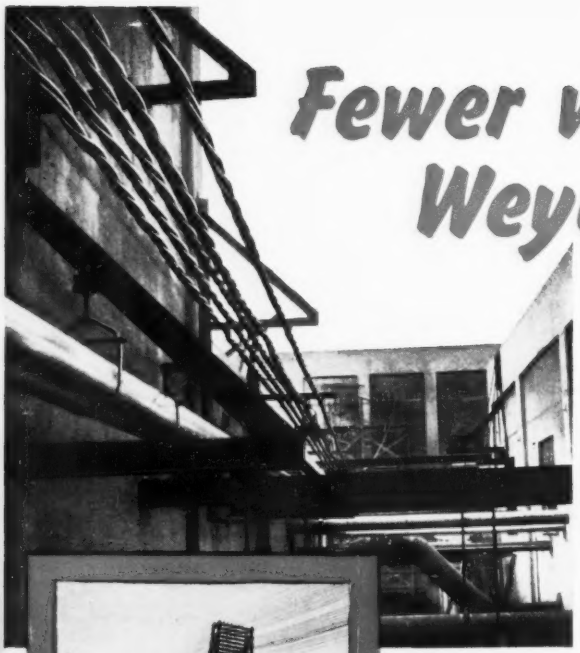
Lineman just opens the door, lifts it off, and hooks on a spare fused door. "PVD" Bakelite doors are interchangeable—you save time when restoring outages.

LINE MATERIAL Fuse Cutouts and Fuse Links

Complete Coordinated Equipment for All Distribution Requirements

7087A

Fewer wires for Weyerhaeuser!



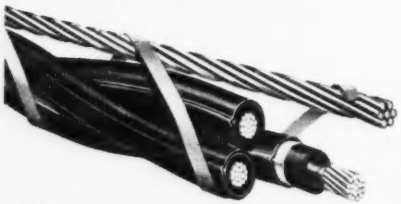
. . . space saved
. . . installation cost lowered
. . . all-weather dependability assured with

OKOLITE-OKOPRENE SELF-SUPPORTING AERIAL CABLE

Contrast the congestion shown in lower picture with the compact, simple installation of Okolite-Okoprene Self-Supporting Aerial Cable (above) at Weyerhaeuser's new pulp mill at Longview, Wash. Recently-erected generating plant is in background. Installation was made by Western Electrical Construction Co., Portland, Oregon.

At Longview, Wash., the new MgO sulphite recovery and new sulphate pulp processing plants of the Weyerhaeuser Timber Company typify the advantages of self-supporting cable in industry for the transmission and distribution of power. Here, Okolite-Okoprene Self-Supporting Aerial Cable serves between a new generating plant and an old one. It contrasts strikingly with the congestion of open wiring.

With Okolite-Okoprene Self-Supporting Cable, *self-evident space economy* is matched by installation economy as it requires no separate stringing. Further savings result from the long life of this storm-safe all-weather cable assembly.



Another feature of Okolite-Okoprene Self-Supporting Cable that makes it valuable in industrial plants is this fact: *safe as well as easy* handling is assured. The cable is fully insulated with Okolite high-voltage moisture and heat-resisting insulation and protected with weather-resistant non-conducting Okoprene. For 52-page Self-Supporting Cable book available to electrical engineers and plant executives, please address The Okonite Company, Passaic, N. J.

7305

THE BEST CABLE IS YOUR BEST POLICY

OKONITE SINCE 1878 insulated wires and cables

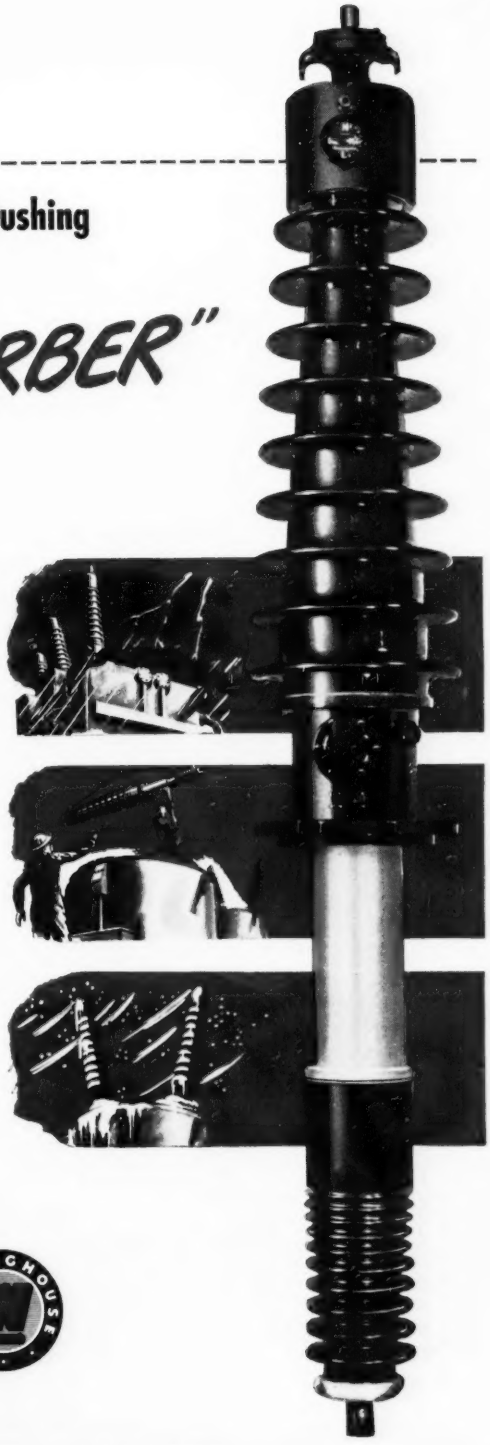
YOU CAN BE **SURE**.. IF IT'S

Westinghouse

Type "O" Condenser Bushing

3 WAY "SHOCK ABSORBER"

FOR POWER CIRCUIT BREAKERS AND POWER TRANSFORMERS



ELECTRICALLY... Insulation of the highest quality is provided in the condenser, which is completely impregnated with degassed oil, hermetically-sealed and cushioned with dry nitrogen to insure continued low internal loss and radio-influence voltage.

MECHANICALLY ... Springs in the cap keep pressure on the gaskets at all times. The porcelains are one piece. Bushing construction is strong mechanically.

THERMALLY... Because of its excellent design—electrically and mechanically—the Type "O" Bushing is not affected by heat or cold. Internal losses do not increase appreciably over the temperature ranges encountered in transformers or circuit breakers.

Greater electrical, mechanical and thermal strength add up to increased safety for your system. All the facts on the Type "O" Bushing are available from your nearby Westinghouse representative. Ask him for Booklet B-3462, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. Also ask for information about circuit breakers and transformers equipped with Type "O" Bushings. J-60711

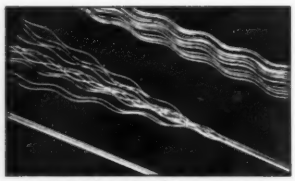
Westinghouse

POWER CIRCUIT BREAKERS
POWER TRANSFORMERS

Made in the WEST.. for the WEST

You Save Time, Trouble, Money

with LOCKE PREFORMED armor rods!



Locke Preformed rods are precision machine-twisted at the factory to fit conductor.

To install: just take strands in bunch and place them across conductor . . .

Twist ends of bunched strands in opposite directions around conductor, keeping ends free . . .

Twist strands from center toward ends —they'll snap into place, fit neatly, grip firmly.

CHECK THESE INSTALLATION CHARACTERISTICS...

EASIER INSTALLATION: Locke Preformed Rods are machine-twisted at the factory to fit conductor. Linemen simply lay Preformed strands across the conductor . . . twist . . . and the job's done.

FASTER INSTALLATION: Even inexperienced linemen can complete an installation in a few seconds.

SIMPLER INSTALLATION: No clips, clamps, special tools or skill are required for proper installation of Locke Preformed Armor Rods.

BETTER INSTALLATION: Because Locke Preformed Rods are made of tough, springy metals, they fit and grip conductor tightly every inch of their length —leave no opportunity for chafing or abrasion due to movement between armor rod and conductor . . . give better protection against corrosion at support points . . . and more satisfactory vibration damping.

RODS ARE RE-USABLE: Locke Preformed Rods may be removed from damaged lines and re-used. The tough, springy metals snap back into their original preformed shape and will fit and grip another conductor just like new.

UNIVERSAL INSTALLATION: Locke Preformed Rods are available for any size and type of conductor, and may be installed with equal facility on either corner or straight line posts. They come in galvanized steel (which won't bite conductor), bronze, aluminum alloy or copper, depending on which type you prefer for your particular job.

SIMPLE INSTALLATION TELLS STORY: For dramatic proof of the amazing difference Locke Preformed Rods make in armoring operations, have your lineman test them with free full-size samples we'll gladly supply.

Locke products are among the many famous name brands carried by General Electric Supply Corporation, assuring you the finest materials obtainable.

GENERAL ELECTRIC
SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE

Another achievement of Shell Research—

SHELL DIALA OIL A·X

a revolutionary transformer oil that gives 50-year service

We went into the problem of oil oxidation

We studied how, under heavy load conditions in transformers, both heat and oxygen could change an oil chemically . . . cause sludge, acidic deterioration products and peroxides. These are the impurities which reduce cooling efficiency . . . damage cloth insulation . . . ultimately corrode exposed copper and iron surfaces. Until our study, there wasn't much you could do about it except to spend money on oil changes and transformer overhaul, or invest in expensive oil protection devices such as conservators.

Shell Diala Oil AX was developed to step costs down

We examined Shell Diala Oil AX against all competitive oils on the market, comparing rates of oxygen absorption at high temperatures as well as more commonly measured properties. Even our top research men were surprised when Shell Diala Oil AX resisted oxidation *140 times longer* than the next best transformer oil. Judging by these accelerated tests, Shell Diala Oil AX *can last better than 50 years in even an open, air-breathing transformer.* That means money saved and then some!

And that isn't all—

Further tests proved that Shell Diala Oil AX, in addition to its remarkable oxidation resistance, possesses all other properties required of superior transformer oil . . . excellent thermal transfer, a dielectric strength above 30,000 volts . . . a very low pour point . . . minimum volatility . . . up to 37% less fabric deterioration. And it is equally effective for oil-filled switches. Ask your Shell representative where and how it can help you.

ARE YOU ABSOLUTELY SURE YOU ARE GETTING ALL THAT'S NEW IN LUBRICATION?

Your Shell Lubrication Engineer can make a complete study and analysis of your plant and machines . . . give you engineering counsel, advice on new lubricants and their application . . . help you set up schedules and controls for each and every machine. For that kind of service — call in your Shell Lubrication Engineer.

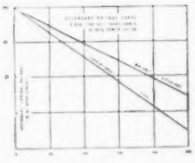
SHELL

The inside story about

MOLONEY *HiperCore* DISTRIBUTION TRANSFORMERS

The inside story about Moloney HiperCore Transformers is centered around the material used in the cores. By using highly efficient oriented silicon steel it is possible to work the cores at higher flux densities than formerly. With the *total* flux requirements remaining practically unchanged, working the oriented steel at higher densities than practical with ordinary silicon steel, results in smaller cross-sectional areas of cores with a consequent reduction in weights.

The smaller cores permit the use of smaller windings, smaller tanks and less oil. This results in lighter weight and smaller transformers which are easier to install and handle generally, and take up less space on the poles. Reductions in size and weight have been made without sacrifice in all-around performance. In fact, HiperCore Transformer operating characteristics are better . . . voltage regulation has been improved . . . greater short-time overloads can be carried.

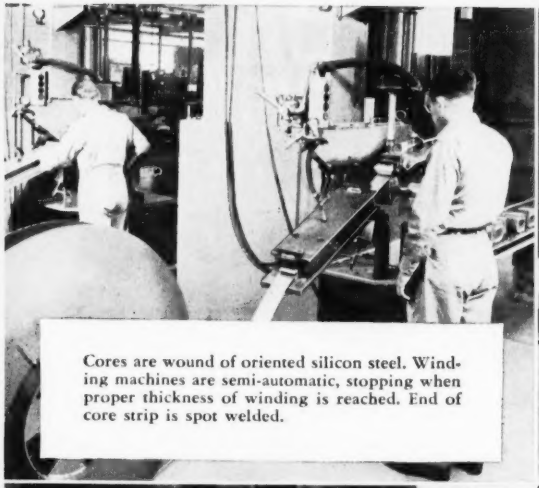


Illustrated are a few of the operations involved in the manufacture of HiperCore Transformers indicating the careful attention given to every detail in order to assure unexcelled on-the-job performance.

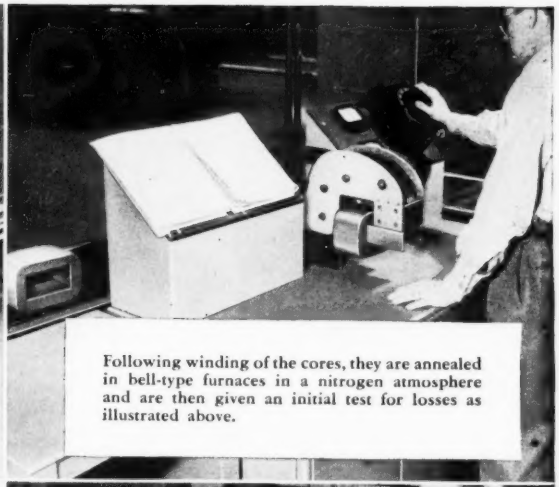
ME49-10

Testing voltage ratios at various tapchanger settings, to make certain that tap leads have been connected to proper studs, and that inter-coil connections are correct.

Placing core-and-coil assemblies in tanks after they have passed through oven which removes any moisture which may have been absorbed from the air, and also cures adhesive on core faces.

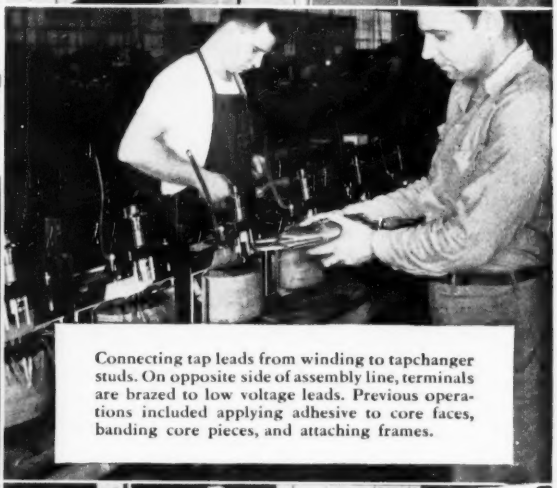


Cores are wound of oriented silicon steel. Winding machines are semi-automatic, stopping when proper thickness of winding is reached. End of core strip is spot welded.

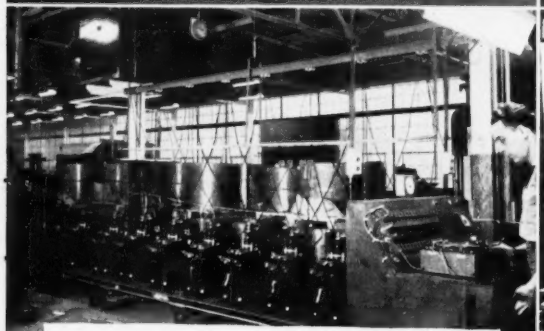


Following winding of the cores, they are annealed in bell-type furnaces in a nitrogen atmosphere and are then given an initial test for losses as illustrated above.

Placing windings into position over U-shaped core pieces. Prior to this operation, cores have been impregnated, baked, cut, etched, and tested a second time.



Connecting tap leads from winding to tapchanger studs. On opposite side of assembly line, terminals are brazed to low voltage leads. Previous operations included applying adhesive to core faces, banding core pieces, and attaching frames.

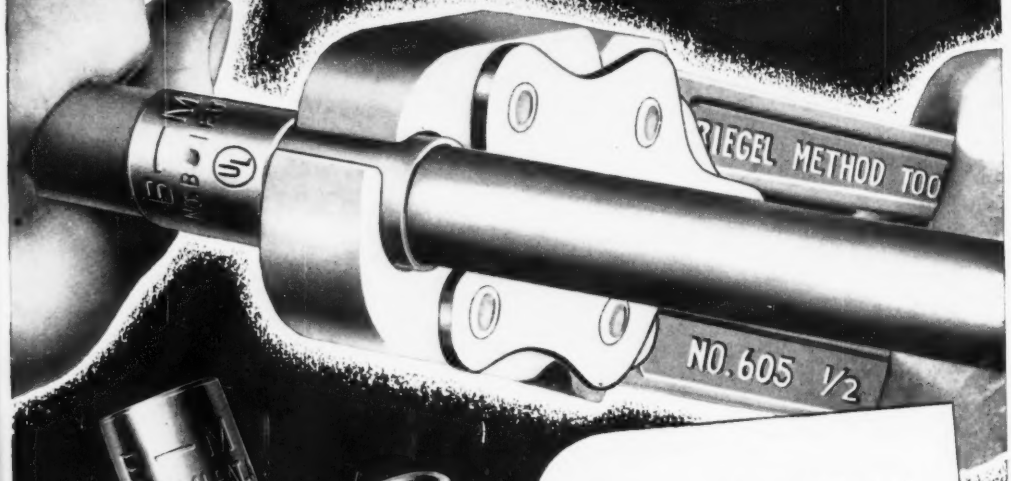


After bushings have been installed, the tanks filled with oil, and the transformers vacuum treated to remove any entrapped air from the oil or windings, final electrical tests are made.

MOLONEY
ELECTRIC CO.
Sales offices in all principal cities
FACTORIES AT ST. LOUIS 20, MO.
AND TORONTO, ONTARIO, CANADA

Get CORRECT CONDUIT CONNECTIONS

The easy economical way



Cross Section Showing Indentations

Select the best, insist on Briegel All Steel Fittings, the original approved Indenter type connectors and couplings for thin wall conduit tubing. You will not only find that Briegel Indenter Fittings are easier and faster to use, but also make neater, stronger connections, the correct connections. Two Easy Squeezes and they're set. Start using Briegel Fittings today. Have more satisfied customers—more profits from each job.

DISTRIBUTED BY

The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport, Conn.; The Steelduct Co., Youngstown, Ohio; Enameled Metals, Pittsburgh, Penn.; Kondu Mfg. Co., Ltd., Preston, Ont.

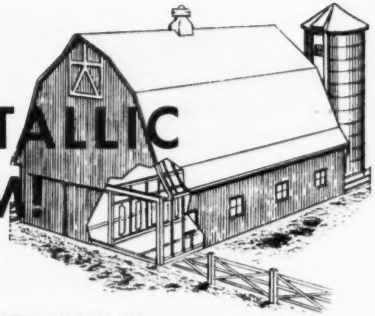
• NEATER • STRONGER • FASTER • APPROVED

All B-M Fittings Carry the Underwriter's Seal of Approval and Canadian Standards Ass'n Approval No. 9296

BRIEGEL METHOD TOOL CO.
GALVA, • ILLINOIS

NATIONAL ELECTRIC has the *COMPLETE* NON-METALLIC FARM-WIRING SYSTEM!

All listed by UNDERWRITERS' LABORATORIES, INC.



NON-METALLIC SHEATHED CABLES

CANVAS-BACK LOOMWIRE

FOR DRY LOCATIONS—NORMAL REQUIREMENTS

Moisture and Flame Resistant. Smooth, Slick Easy Working

A new, smaller diameter cable. **"Canvas-Back"** Loomwire is the most economical system for farm wiring. Ideally suited for all types of wiring not subject to undue moisture, drastic changes in atmospheric conditions or severe usage. Available with Type R or Type T conductors.

NE-O-PRENE LOOMWIRE

DESIGNED FOR WET LOCATIONS—SEVERE USAGE

SEALS OUT: Fumes, Flame, Moisture, Oil and Grease

RESISTS: Rot, Acid, Fungus, Mechanical Abuse

Ideal for barns, stables, milk houses, hatcheries, and other locations where moisture, ice, ammonia-laden air, rot, fungus and drastic weather changes are destructive to other approved types of wiring.

NON-METALLIC UNDERGROUND CABLE

FLEXLAY CABLES

FOR UNDERGROUND SERVICE—ELIMINATES OVERHEAD LINE HAZARDS

RESISTS: Abrasion, Water, Grease, Oil, Soil Acids

WITHSTANDS: Flexing, Kinking

Type USE, Style RR, **"Flexlay"** Cables provide the most economical, permanent underground electric service installation. The direct burial of **"Flexlay"** in the ground eliminates overhead wires from power line to meter and to the various farm buildings.

PLUS WIRING SYSTEM ACCESSORIES for all Farm Wiring Jobs:

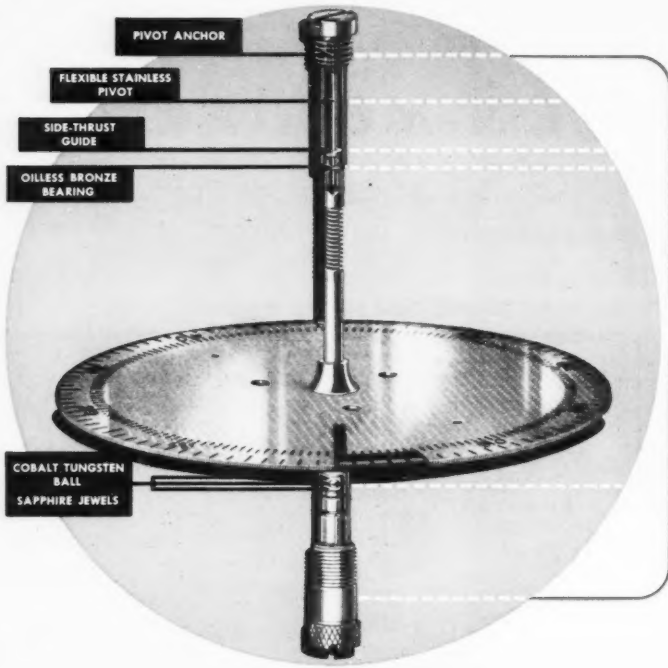
"REDEGE"	"EZ"	"EZ"
Outlet and device boxes	Box Connectors	Cable Ripper

You are *always safe* when you recommend National Electric Wiring Systems. Sold through leading electrical wholesalers. *Write* for the new Farm Wiring Catalog *Today.*

NATIONAL ELECTRIC PRODUCTS
NE
WIRING SYSTEMS
WIRES AND CABLES

National Electric Products Corporation

1308 CHAMBER OF COMMERCE BLDG., PITTSBURGH 19, PA.



SERVICE PROVED BEARINGS

•

Oilless
Noiseless
Troublefree

Sangamo J Watthour Meters

Sangamo J Meters are equipped with a modern improved *oilless, noiseless, non-corrosive bearing system—proved* by 9 years of troublefree service. As shown in the diagram above, the lower bearing assembly consists of a non-ferrous cobalt tungsten ball and two sapphire jewels, while the oilless upper bearing is a flexible, stainless steel pivot of a length designed to avoid frequency vibration and the resultant noise.

Sustained Accuracy . . .

The accurate performance of this bearing system is proved by a large group of J Meters, tested after 9 years in actual customer service, which showed a variation averaging only five-hundredths of 1% in accuracy from that at the time of installation!

Troublefree Service . . .

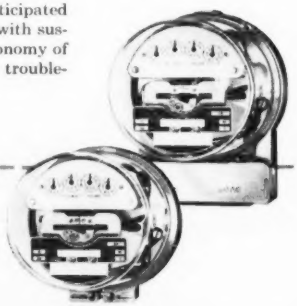
The J Meter bearing system, non-corrosive and rustproof in all climates, has been proved troublefree by the performance records of millions of these meters in service since 1940.

Economy of Maintenance . . .

This truly modern bearing system requires no adjustment. Sangamo J Meters are built for quick and economical maintenance. All repairs are minor repairs with the Type J Meter.

* * *

Sangamo J Meters have proved their ability to meet the requirements of today and the anticipated loads of the future with sustained accuracy, economy of maintenance and trouble-free performance.



50TH ANNIVERSARY SANGAMO 1899 - 1949

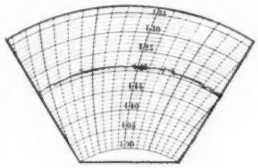
SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

EM450

Closer Regulation at Lower Cost

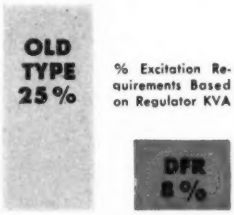
WITH ALLIS-CHALMERS DFR* 5/8% STEP FEEDER VOLTAGE REGULATORS

HERE'S WHY!



REASON 1

Holds voltage within ± ¾ volt band. Closer simpler control is made possible by Feather Touch Control and Voltage Integrator. Line fluctuations are followed accurately without damping effect by Feather Touch Control; Voltage Integrator sums up and balances out voltage fluctuations of short duration.



REASON 2

Requires only ⅓ the excitation of other types! Low exciting current of Allis-Chalmers regulators releases system capacity for useful loads . . . can be evaluated in total savings up to 5% of purchase price. (Specific information is available on this very important point.)

Regulation	Amp Capacity
±10 %	100%
± 8¾%	114%
± 7½%	133%
± 6¼%	160%
± 5 %	200%

REASON 3

Boosts base current capacity as much as 200% in as many as five intermediate steps with exclusive *Vari-Amp* feature. Simple 30 second adjustment adapts standard single phase regulator to increased load current demands with only corresponding decreases in regulation range. No need for by-passing or removing regulator from the line during adjustment.

Vari-Amp is an Allis-Chalmers trademark.

REASON 4

Keeps maintenance costs low. In actual installations the quick-break tap changing mechanism and long life contacts have withstood hundreds of thousands of tap changes! These records are due to (1) the balanced spring action of the tap changing mechanism, (2) the small KVA interrupted with 5/8% steps, and (3) use of Elkonite RS — 1045 contacts.

*DFR — station type single phase regulator sizes to 6900 v, 250 kva.
AFR — three phase regulator sizes through 69 kv, 2500 kva.

LEARN MORE about how other utilities are boosting load capacity of their feeders, increasing revenue, improving customer goodwill by using Allis-Chalmers 5/8% step regulators. Have your nearby A-C sales representative call and discuss these regulators in terms of specific advantages to your system or write for bulletins 01B6065A and 01B6056B. A-2742

ALLIS-CHALMERS, 939A SO. 70 ST
MILWAUKEE, WIS.

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

KAISER ACSR CUSTOMERS GETTING DELIVERIES NOW!

A MAJOR NEW SOURCE of aluminum conductor is now making high quality ACSR.

Perm.nente Metals' new plant, centrally located at Newark, Ohio, is producing—*and shipping*—Kaiser ACSR.

Initial orders are going to REA-financed Co-ops, U. S. Bureau of Reclamation, Bonneville Power Administration, and public and private utilities from coast to coast.

Assuring the high quality of Kaiser Aluminum Cable and ACSR is the most modern rod, bar, wire, and cable production equipment in the aluminum industry—manned by experienced, highly skilled personnel. A full range of standard strandings and sizes is being produced.

Do you need aluminum conductor? If you act now you may be able to take advantage of some early delivery schedules which are still open. Contact any office of Permanente Products' nationwide sales organization.

Permanente Metals

PRODUCER OF

Kaiser Aluminum Cable

SOLD BY PERMANENTE PRODUCTS COMPANY, KAISER BUILDING, OAKLAND 12, CALIFORNIA . . . WITH OFFICES IN:
Atlanta • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles
Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Portland, Ore. • Seattle • Spokane • St. Louis • Wichita
Also available through General Electric Supply Corporation, Westinghouse Electric Supply Company, and Line Material Company

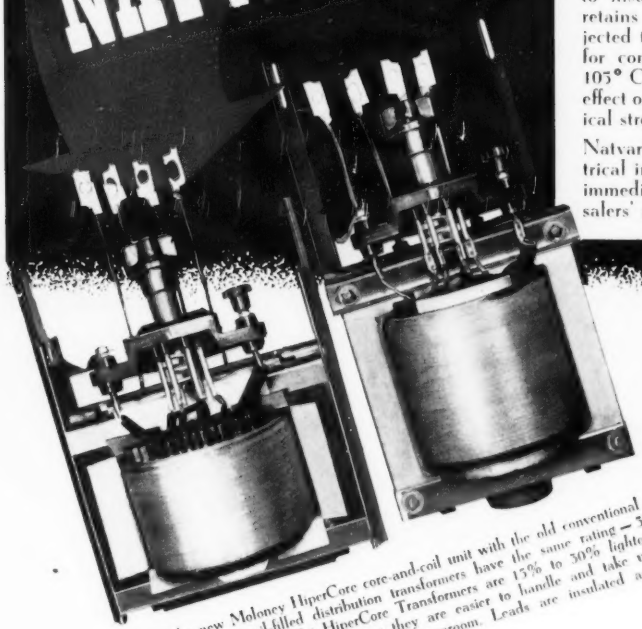
MOLONEY ELECTRIC'S NEW *HiperCore* TRANSFORMER HAS LEADS INSULATED AND PROTECTED with NATVAR 400

THE new HiperCore Transformers manufactured by Moloney Electric Company, St. Louis, are lighter and smaller than their predecessors, and yet have improved performance characteristics. They provide better voltage regulation and permit greater short-time overloads.

Cores are wound of high permeability, oriented silicon steel having 30% to 50% greater flux carrying capacity than hot rolled core steel, making it possible to decrease the amount of steel, copper and other materials, and at the same time improve operating characteristics.

Natvar 400 Extruded Vinyl Tubing is used to insulate and protect leads because it retains its original properties when subjected to *both heat and oil*. It is approved for continuous operating temperatures of 105° C. and immersion in oil has no adverse effect on its flexibility, dielectric, or mechanical strength.

Natvar 400 and other Natvar flexible electrical insulating materials are available for immediate delivery, either from your wholesalers' stocks, or direct from our own.



Compare the new Moloney HiperCore core-and-coil unit with the old conventional type. Both of these oil-filled distribution transformers have the same rating — 3 Kva, 7200-120/240 volts. Yet HiperCore Transformers are 15% to 30% lighter and up to 30% smaller, which means they are easier to handle and take up less space on the line truck and in the storeroom. Leads are insulated and protected with Natvar 400.

Represented by Electrical Specialty Co.

San Francisco 3, 316 Eleventh St. — Los Angeles 13, 418 East Third St. — Portland 5, 325 N.W. 6th Ave.
Seattle 1, 2406 First Ave. — Denver 2, 1015 21st St.

Natvar

Natvar Products

- Varnished cambric—straight cut and bias
- Varnished cable tape
- Varnished canvas
- Varnished duck
- Varnished silk
- Varnished special rayon
- Varnished Fiberglas cloth
- Silicone coated Fiberglas
- Varnished papers
- Slot insulation
- Varnished tubings and sleevings
- Varnished identification markers
- Lacquered tubings and sleevings
- Extruded vinyl tubing and tape
- Extruded vinyl identification markers

Ask for Catalog No. 21

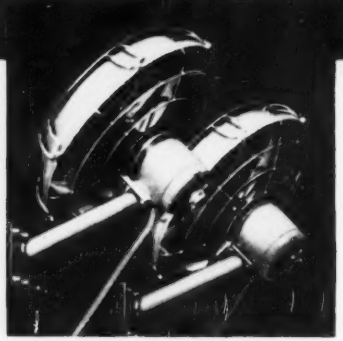
THE NATIONAL VARNISHED PRODUCTS Corporation

TELEPHONE RAHWAY 7-2171 — CABLE ADDRESS, NATVAR: RAHWAY, N. J.

233 RANDOLPH AVENUE ★ WOODBRIDGE, NEW JERSEY

67% extra capacity

with General Electric "Super-Fan" cooled power transformers



This is the aphonic fan used with General Electric's "Super-Fan" cooled transformers. Each of these 19½-inch fans delivers 4000 cu. ft. of air per minute under pressure, and is driven by a three-phase, 230-volt, ½-hp motor.

This is a typical class OA/FA/FA transformer—a transformer with a self-cooled rating and two distinct, higher ratings using two different levels of forced-air cooling. It was introduced by General Electric in 1943, and now has a firmly established place in the forced-cooled family of power transformers.

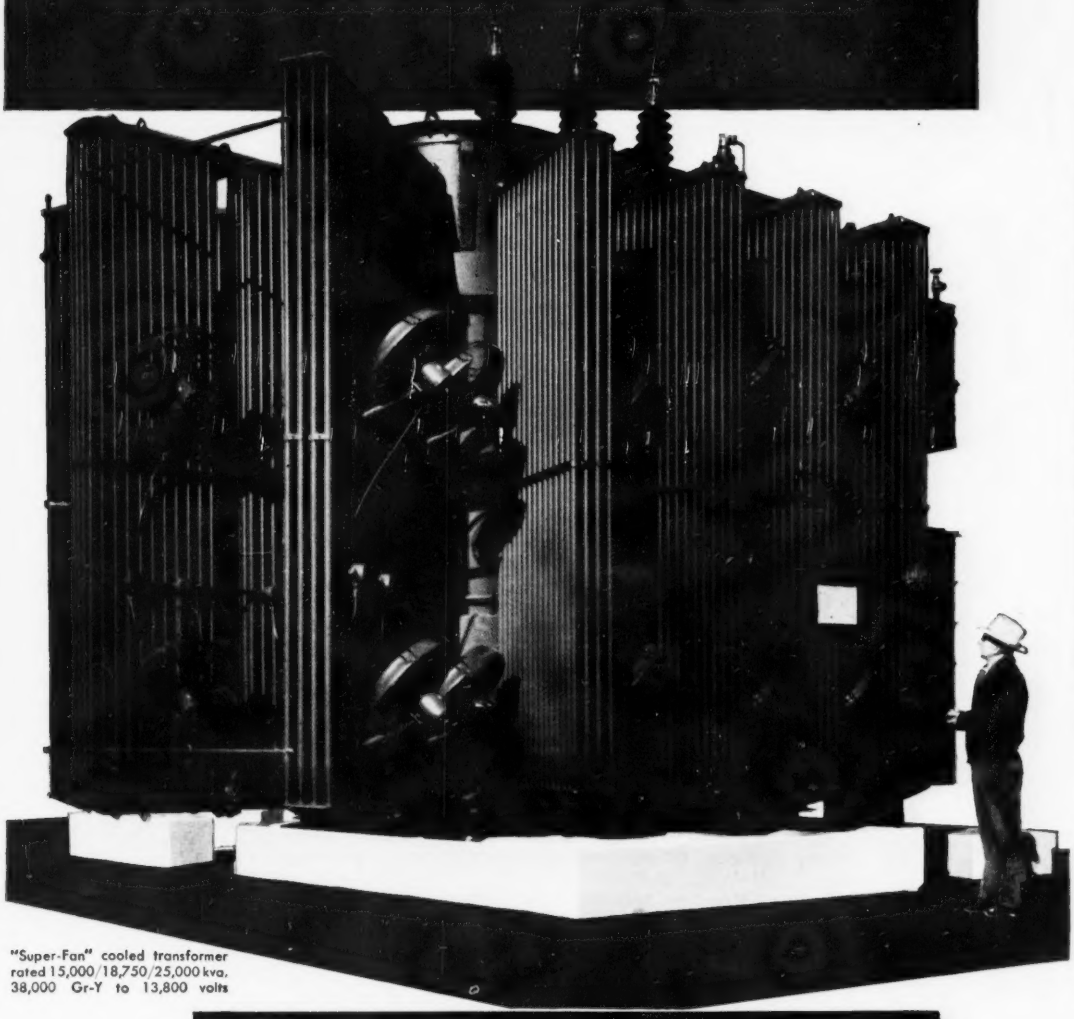
Self-cooled, the transformer is rated 100%. With one set of fans, this rating is increased to 125% and with both sets of fans, the rating becomes 167%. The fans are automatically controlled by means of winding temperature equipment as the load increases or decreases. The "Super-Fan" cooled transformer has less total weight, smaller physical size and a lower price than a comparable self-cooled unit.

"Super-Fan" cooling finds its greatest application on transformers in the range of 10,000 to 83,333 Kva. This transformer has two principal fields in which it finds the greatest acceptance. It is widely used in place of self-cooled transformers where the saving in cost, over-all weights and dimensions are important. "Super-Fan" cooling is also used in smaller sizes as an alternative to forced-oil-cooled transformers where the latter cannot be economically justified, or in any application where an increase in rating is desired without the use of oil pumps.

* * *

"Super-Fan" cooled transformers represent but one example of present-day accomplishments in large transformer design. The whole picture is continually changing. But with all the changes one constant remains—you can continue to look to General Electric for leadership. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

whenever needed



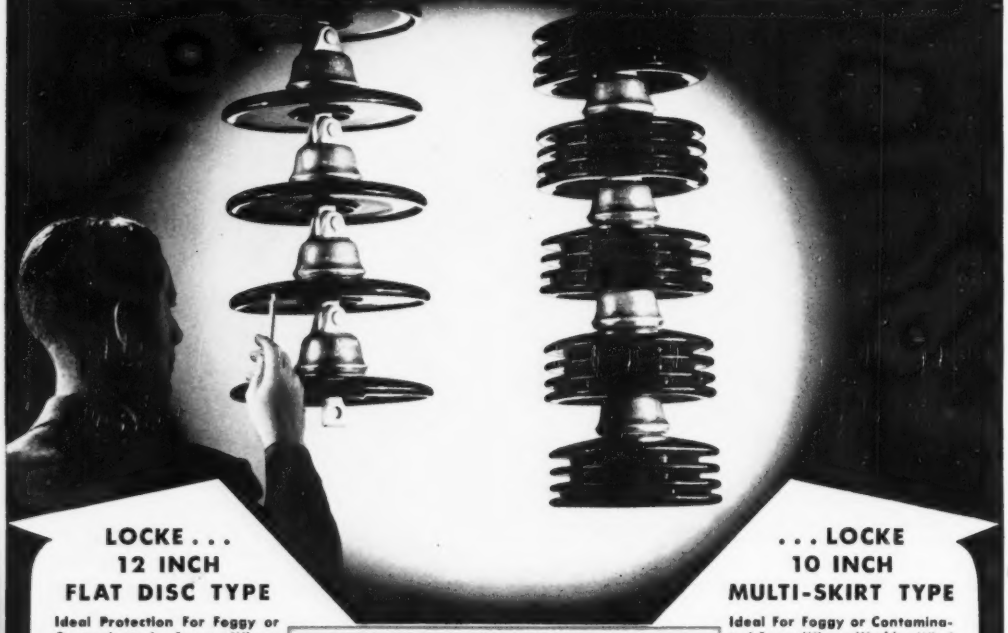
"Super-Fan" cooled transformer rated 15,000/18,750/25,000 kva. 38,000 Gr-Y to 13,800 volts

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

For CONTAMINATED Areas-

6 Point *FLASHOVER* Protection with LOCKE *FOG-TYPE* Insulators



LOCKE . . . 12 INCH FLAT DISC TYPE

Ideal Protection For Foggy or Contaminated Areas Where *Washing* Wind and Rains Are *Frequent*.

1. Full 12 Inch Shell Diameter assures plenty of clear arcing distance.
2. No Deep Corrugations or Undercuts mean no dirt traps.
3. Smooth surfaces easily cleaned by wind and rain.
4. Open leakage distance, 10¼ inches, simplifies natural and manual cleaning.
5. Large vertical drip distance minimizes possibility of flashover during rainstorms.
6. Small corrugations at pin form barrier on underside which minimize ionized streamers.

When contamination is a major problem, use Locke Fog-Type insulators. You'll find they're especially effective in severely contaminated areas where film deposits—moistened by fog, dew or light rain—can cut insulator flashover voltage by as much as 80%.

Locke Fog-Type insulators are made of rugged porcelain with Compression Glaze. Large diameter pins reduce leakage current concentration at cement line and minimize any tendency to corrode or pit the pin. Ample space between units is provided for hot line maintenance work.

Next time you're up against a contamination problem, get Locke Fog-Types.

"Distributed by General Electric Supply Corporation"

LOCKE
INCORPORATED
BALTIMORE, MARYLAND

. . . LOCKE 10 INCH MULTI-SKIRT TYPE

Ideal For Foggy or Contaminated Areas Where *Washing* Wind and Rains Are *Not Frequent*.

1. Larger shell diameter provides greater arcing distance.
2. No undercut in outside corrugations permits easy cleaning by wind and rain.
3. Vertical skirt inside shell provides additional *protected* leakage distance.
4. Leakage distance balanced with parallel arcing paths means efficient utilization of full 18" leakage distance.
5. Less shell depth provides greater vertical drip distance.
6. Small corrugations at pin minimize ionized streamers.

Before you buy STOP! See what Locke's Got . . .

RoZone*

Rome's ozone-resistant insulation that surpasses specifications

500,000 CM stranded single conductor RoZone insulated, shielded, RoPrene sheathed, power cable . . . 5000 volts.*

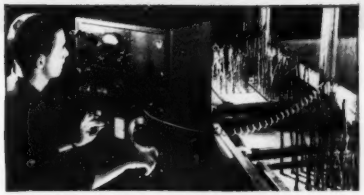
RoZone*, an oil-base, ozone-resistant insulating compound, can be depended upon for service performance "above and beyond the call of duty" . . . a *plus* value assured by *plus* quality controls. In maintaining RoZone's high standard of quality there can be no half-way measures. That is why Rome Cable control of quality goes *beyond* specification test requirements . . . to make certain that every length of RoZone* insulated cable possesses that *plus* quality for dependable long cable life.

High electrical stability in wet locations, immunity to the effects of corona and ozone, high dielectric and surge strength, and low dielectric loss, place RoZone* in an unexcelled position for higher voltage applications. For circuits of 8000 volts, or less between phases, at operating temperatures up to 75 C, RoZone* will give you a new conception of cable performance.

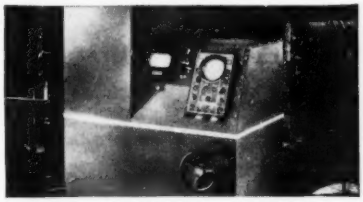
RoZone* insulated cables can be supplied with or without electrostatic shieldings and are manufactured with RoPrene (Neoprene) sheath or other conventional cable coverings as specified. RoZone* is particularly recommended for series street lighting and power distribution circuits; motor, generator and transformer leads; as well as station control and other general purpose wiring where high quality is paramount.

For complete engineering data write for your copy of Specification RO-4.

*TRADEMARK REGISTERED



Moisture resistance of insulated cable specimens is measured electrically in long time immersion tests.



Corona level of RoZone insulated cables is determined by means of this equipment.

RoZone's resistance to ozone cutting is determined by exposing specimens to ozone atmosphere.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

ROME CABLE ROME, N.Y.

PACIFIC COAST SALES OFFICES

SALT LAKE CITY 1, UTAH
462 Union Pacific Annex Bldg.

LOS ANGELES 21, CALIF.
2038 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3404 Fourth Ave., So.

Wagner Distribution Transformers

are *Standardized*

to meet your requirements

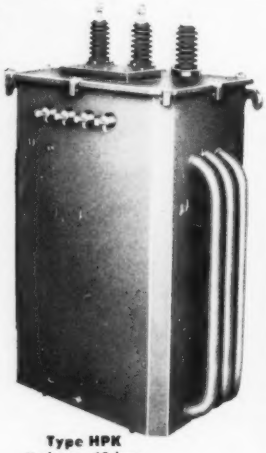
Wagner's complete line of distribution transformers includes every rating and design listed in the E. E. I.-NEMA Fourth Report! This means that you get the benefit of the improved design, quality construction and high efficiency of Wagner Transformers with *standardized* mechanical features in ratings of 500 kva and below—15,000 volts and below.

You save time, money and worry when you make your selection from Wagner's widely diversified line of distribution transformers — no matter what your particular requirements may be . . . there's one to fit your needs.

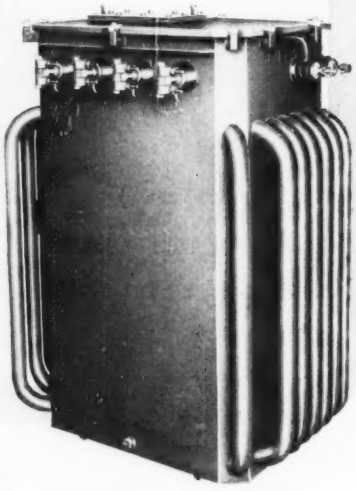
Type HEK
Single-phase
3 kva.

Type HEX
Single-phase
25 kva.

Type HEB
Single-phase
75 kva.



Type HPK
3 phase—45 kva.



Type HPB
3 phase—112½ kva.

Wagner has a nationwide organization to provide fast, convenient service, with 29 branches located in principal cities ready to help you with your transformer problems. Bulletins TU-180 and TU-181 give complete information on Wagner Transformers.

T49-1

Wagner Electric Corporation
6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.

Consult Wagner Engineers on All Transformer Problems

BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

You know you're right with "G-E White"

1. Tough, baked-on Glyptal* lacquer finish outside
2. Hot-dipped zinc outside
3. High-grade steel
4. Hot-dipped zinc inside
5. Tough, baked-on Glyptal lacquer finish inside
5 WAY WIRING PROTECTION

These are five of the reasons why General Electric white rigid conduit is such a general favorite with electrical contractors and maintenance men everywhere.

Always, when you think of conduit for protection from atmospheric corrosion, think of "G-E White." For further information, see your nearest General Electric Construction Materials distributor, or write to Section C21-725, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

*Trade-mark Reg. U. S. Pat. Off.

GENERAL ELECTRIC

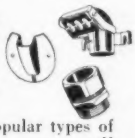
RACEWAYS ROUNDUP

with your

GENERAL ELECTRIC

Construction Materials Distributor

Where chemical corrosion is a threat to wiring, specify General Electric black rigid conduit. "G-E Black" is made from the same high grade steel as "G-E White." "G-E Black" is treated with a protective coating of tough, black enamel, baked on at high temperature. This hard, glassy-smooth finish makes wire pulling easy, and is an excellent paint base.



Service entrance cable fittings in a wide variety are available from General Electric. This line includes a large selection of the popular types of waterproof entrance caps, sill plates, cable straps and watertight connectors.

If you're wondering how to get raceway protection for wiring in cramped quarters, for machine tool or temporary wiring, General Electric flexible steel conduit is the answer. This conduit is strong, yet very flexible. It's quickly installed, and the zinc-coated strip steel is wound in a way that makes wire pulling easy.

Your General Electric distributor can save you lots of time and trouble when you order wiring materials. Because he carries the complete General Electric line, you can order every item you need from him. One order does it — no running around getting part of your order in one place and part in another. It's the kind of "one-stop, one-package" service busy contractors need to help stretch scarce working hours.

Conduit Products

IT TAKES LESS THAN

half the torque

TO TIGHTEN THIS

new KYLE type HD two-bolt HEAVY DUTY CONNECTOR

Here's an ideal connector for heavy stranded wire from 4/0 to 1000 MCM. It's easy on cable; gives a firm, low-resistance connection that stays cool; bolts won't drop out; it's easy to tighten, and it just won't come loose!

The tightening force is applied by two bolts which accommodate the standard lineman's wrench instead of the large wrench required for split bolt connectors of the same size. As the table below shows, tightening torque required is quite low—which linemen will like—and which, along with the copper spacer bar, prevents crushing and distortion of strands.

and it stays tight!

A unique feature is that, as bolts are tightened, the tension causes a slight deformation in the bronze cap which locks the bolts tightly in place. Vibration won't—can't—loosen them! Yet the cap springs back to its original shape when the bolts are loosened, so this locking action does not affect the re-use of the connector.

See how easy it is to tighten Kyle "HD's"!

SIZES Stranded Wire	RECOMMENDED TIGHTENING TORQUE	
	Per bolt, for type HD connectors	For split bolt connectors
4/0	240 inch-pounds	750 inch-pounds
350 MCM	300	800
500 MCM	360	850
750 MCM	540	1200
1000 MCM	600	1400

Picture shows the 350 MCM size of the new Kyle HD Connector. Body and cap are red brass; spacer bar is copper; and bolts are silicon bronze. Also furnished zinc-plated for conductors other than copper. The connector is designed so as to give a tight, low resistance connection without distortion of the strands. Nicely rounded body makes it easy to do a good tape job. It's easy to tighten, and has many other advantages over split bolt connectors—yet it costs even less. It's a good job—and a good buy for you! Try it!

For samples and prices ask the L-M Field Engineer, or wire or write

KYLE COMPANY division of Line Material Company

Box 2077, Milwaukee 1, Wisconsin

7122

KC LM

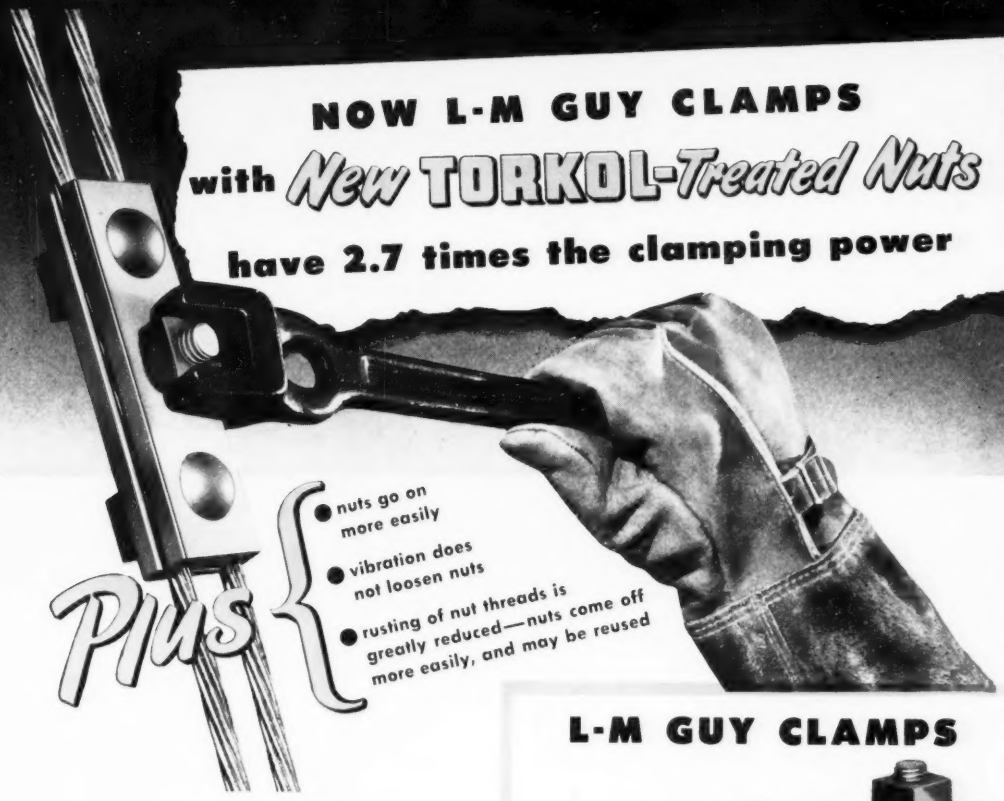
LINE MATERIAL Kyle Connectors

Complete Coordinated Equipment For All Distribution Requirements

NOW L-M GUY CLAMPS

with *New* TORKOL-*Treated Nuts*

have 2.7 times the clamping power



Plus

- nuts go on more easily
- vibration does not loosen nuts
- rusting of nut threads is greatly reduced—nuts come off more easily, and may be reused

WHAT TORKOL IS AND WHAT IT DOES

TORKOL is an exclusive L-M product applied to the nuts of L-M guy clamps. It is a lubricant that increases the effective clamping power from 2.7 to 3.3 times for any given amount of torque.

Proved by 5 Years of Field Testing . . .

now adopted as standard for these reasons:

TORKOL does not creep or flow to adjacent electrical contacting parts under normal outdoor temperatures; it is not affected by weather changes or rain or sleet.

TORKOL is not appreciably displaced when the nut is tightened. Therefore it protects the threads from damage and rusting, permitting easy removal of the nut when desired. And nuts may be reused.

Vibration does not loosen **TORKOL**-treated nuts.

TORKOL is clean, dry. It does not discolor hands, gloves, or clothing. It does not collect dust.

ALL L-M guy clamps are furnished with **high strength bolts.** Nuts only are treated with **TORKOL**, which is colored yellow for identification.

L-M GUY CLAMPS

Heavily galvanized steel, in one to four bolt sizes, from $1\frac{7}{16}$" to 8" long, light or heavy weight, for wires from $\frac{1}{4}$" to $\frac{7}{16}$". Furnished with high strength bolts and **TORKOL**-treated nuts, at **NO extra cost.**

Bolts are opposed as shown. Oval holes in both plates permit inverting the oval shank bolts. Smooth grooves with rounded ends prevent damage to wire.

For details on these and other clamps, and samples of **TORKOL**-treated nuts **ask the L-M Field Engineer or write Line Material Company, Milwaukee 1, Wisconsin.**

7124

LINE MATERIAL Pole Line Hardware

Complete Coordinated Equipment for All Distribution Requirements

CIRCUIT BREAKERS GIVE REPEAT PROTECTION

Nothing to Burn Out
Nothing to Replace

Use Square D's Thermal-Coilless Magnetic Circuit Breakers on ALL lighting and power circuits for these additional advantages:

Complete Protection • THERMAL element holds harmless momentary overloads but trips before wire insulation overheats on continuous overloads. MAGNETIC element trips quickly on shorts to localize damage.

Downtime Minimized • Nothing burns out. No live parts exposed. Can be quickly reset by ANYONE.

Non-Tamperable • Factory test-tripped and sealed. Guards against well-intentioned but dangerous home remedies.

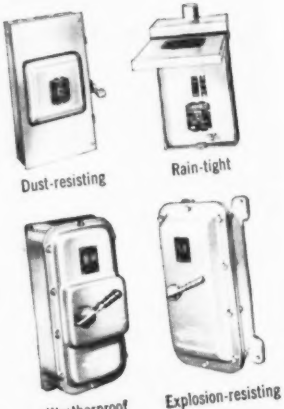
Manual Switching • Simple mechanism is designed for long life under severe service. Contacts are capable of interrupting shorts.

More Wiring Space • Compact mechanism permits wide gutter space in SMALL enclosure.

Full Line • Five frame sizes, many ratings and four enclosure types.

	AMPERE RANGE			
VOLTS	ML	ML 1	ML 2	ML 3	WL
250	15-50	70-100	—	125-225	225-600
600	—	15-50	70-100	125-225	225-600

An Enclosure for EVERY APPLICATION



Write for BULLETIN 600. Address Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

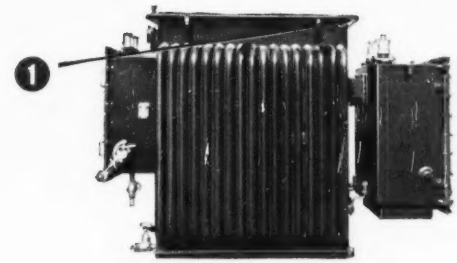
SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

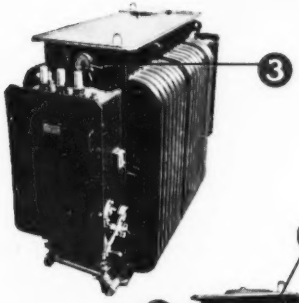
The a-c secondary network system is now recognized as *the* lowest-cost system for providing high-quality service to heavy load areas. While normally used for business sections of cities—50,000 or more in population—it will frequently pay its way in smaller towns as well.

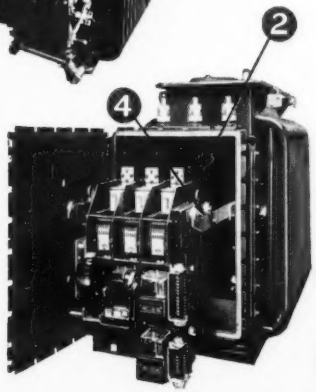
But—to realize the full savings possible with networks, you must use standardized network equipment. For example:

YOU SAVE ON MAINTENANCE when you specify

Standardized Network Equipment







1 MAJOR GASKETS ARE ELIMINATED by welding, not bolting, transformer cover and switchbox to the main unit. Locating the tap changer behind a pipe plug eliminates a packing gland around an external shaft.

2 BUSHINGS can be removed externally, without opening the main transformer tank.

3 ALL TRANSFORMER ACCESSORIES—liquid-level gages, thermometer, tap changer, and all valves—are located at the high-voltage end of the transformer, easy to get to and check.

4 NETWORK PROTECTOR can be slid out on rails for quick inspection. Relays plug in—can be easily removed and replaced for checking.

PLUS **FASTER DELIVERY**— G-E standardized network transformers and protectors can be supplied on shorter delivery.

LOWER PRICE— G-E standardized network units are appreciably lower in price than non-standard designs.

LOWER INSTALLATION COSTS— G-E standardized network units are designed for narrower, shallower vaults, saving substantially in vault-construction costs.

Ask your G-E representative or write to Apparatus Dept., General Electric Company, Schenectady 5, N. Y. for full information on standardized network equipment. Bulletin GEA-5024 describes network transformers; GEA-2017, network protectors.

INCREASED Interrupting Ratings on Network Protectors

Type	Continuous Rating in Amperes	Interrupting Rating in Max. R.M.S. Amperes
MG-12	200 to 600	20,000
MG-8	800 to 1600	30,000
or	2000	35,000
MG-9	2500 and 3000	60,000

GENERAL ELECTRIC

4H8-72

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

New!

GLAZON TRADE MARK "TRIEX"

PREPARES FOR STRIPPING 5 times Faster!

HERE'S WHY:

The Present Way

You have to split the outer covering and trim it off. Then rip off the filler if it doesn't come away clean. Spread the wires apart and u-n-w-i-n-d the kraft paper wrap from one, *then* u-n-w-i-n-d the paper wrap from the other.

The New TRIEX Way

Just split the "Glazon" covering—tear it off—zip! The wires are ready to strip! That's all!

PLUS! EXTRA THICK INSULATION!

Not just the 2/64th rubber thickness found in ordinary cable . . . nor even a generous 3/64ths . . . but 4/64ths inch thickness of Type R rubber surrounds each conductor—even on sizes 14 and 12! You can see for yourself what this means in terms of extra protection . . . extra safety—and at no extra cost!

PLUS! EXCLUSIVE "GLAZON" COVERING!

TRIEX is the only non-metallic sheathed cable with this tougher, stronger, longer-lasting outer covering. Based on an inorganic substance derived from glass—which cannot burn, rot, or corrode; which is not affected by water, moisture, acid fumes, fungus or sunlight—"Glazon" achieves new highs in resistance to fire, moisture, oil, rodents and other elements that attack ordinary coverings. Clean and easy to handle—new finish uses no mica—it's slick!

Now you can prepare TRIEX Non-Metallic Sheathed Cable for stripping *five times as fast* — thanks to this new Triangle development!

Compare the *ordinary* way of preparing *present* types of non-metallic sheathed cable with the *faster* way, the *easier* way, the *simpler* way, of preparing Triangle's *new* TRIEX! See for yourself how *you* can save time and money at every switch box, outlet box, junction box . . . wherever connections are made!

Available in sizes 14/2, 14/3, 12/2 and 12/3 . . . solid or stranded . . . with or without ground wire. For 600 volt service.

If It's "Glazon" TRIEX It's Made by Triangle . . .
If It's Made by Triangle IT MUST BE RIGHT!

For samples and full information, contact your nearest Triangle distributor or representative, or write

ARTERIES FOR ELECTRICAL SYSTEMS INCORPORATED

IT MUST BE RIGHT!

TRIANGLE CONDUIT & CABLE CO., INC.

1904 JERSEY AVENUE • NEW BRUNSWICK, N. J.

PLANTS: NEW BRUNSWICK, N. J. • MOUNDSVILLE, WEST VA.

BUILDING WIRE • BARE WIRE • ARMORED CABLE • "GLAZON" TRIEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE, SERVICE DROP, VARNISHED CAMBRIC BRAIDED OR LEADED, TRIOPRENE TRENCH, POWER AND PARKWAY CABLES RIGID CONDUIT • ELECTRIC METALLIC THIN WALL CONDUIT • FLEXIBLE STEEL CONDUIT

DEALERS! TRY THIS AMAZING ONE-SECOND DEMONSTRATION

See how easy it is to sell Fedders Room Air Conditioners

Just follow these three simple steps:

1. BLOW ON YOUR HAND 2. NOW MOISTEN IT 3. BLOW AGAIN

FEEL THE DIFFERENCE? How much cooler the air felt on your hand *after* you had moistened it!

That's the same way the Fedders Room Air Conditioner works. It takes only a second to show a prospect the extra comfort he gets. Now is the time to cash in on this unlimited market. Here are six good reasons for selling and promoting Fedders for extra profits:

1. READY MADE PROSPECTS Everyone knows and wants the benefits of air conditioning. But most people don't realize how cheaply they can get it—with Fedders smart new line of room air conditioners.

2. UNTAPPED MARKET Every home, every office, restaurant, hotel and institution is a prospect for one or more Fedders units.

3. NO TRADE-INS No allowances to plague you. Every Fedders sale is a clean, full profit deal for you.

4. PACKAGED UNIT SALE Each unit is a complete system of electrically refrigerated air conditioning. Just install it in the window and plug it into any standard outlet. No ducts, no piping, no building alterations.

5. IT'S A "NATURAL" FOR YOU You'll sell it to the same people who are customers for washers, refrigerators or other appliances. And it's a high-profit item loaded with specialty selling features your salesmen will love.

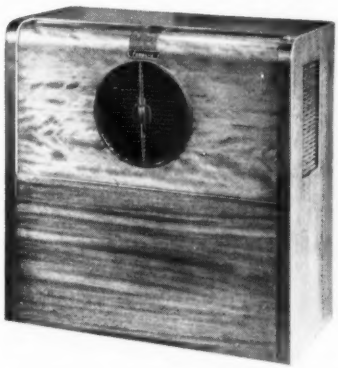
6. BACKED BY 53 YEARS' EXPERIENCE You can sell Fedders with confidence. Fedders has specialized in heat transfer equipment since 1896. Don't delay. Mail the coupon now for full details.

fedders

A GREAT NAME SINCE 1896

Both ½ h. p. and ¾ h. p. window models available in ivory finish or bronze with burl walnut.

FAST SELLING FOR QUICK PROFITS



¾ h. p. Floor Console Model. All wood cabinet in mahogany finish. High cooling capacity.

MAIL COUPON TODAY

FEDDERS-QUIGAN CORPORATION
Unit Air Conditioner Division,
Dept. EW-1, Buffalo 7, N. Y.

Let's have the full story on how I can make money on the Fedders line.

Name.....

Company.....

Address.....

City.....*County*.....*State*.....

MAIL THIS COUPON FOR FACTS

However Supported

. . . All Simplex Aerial Cables Provide These Worthwhile Advantages Over Open Wire Lines:

- Little tree trimming required
- Elimination of crossarms
- Smaller clearances needed
- Less congestion
- Better appearance
- Fewer service interruptions when exposed to winds, icing, lightning, and moisture
- Lower reactance; Better regulation
- Higher safety factor for linemen and for people and property below
- Lower maintenance costs

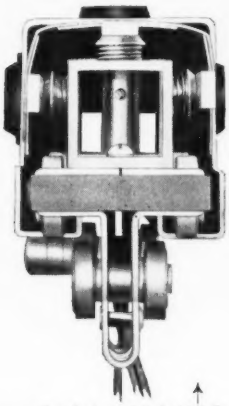
Simplex Aerial Cables are available for power, communication, and control systems of utilities, industries, railroads, police and fire departments.

They can be insulated with the famous moisture-resistant Anhydrex insulation, or with paper, varnished cambric, or polyethylene in order to meet the demands of each type of service. They are protected by either a neoprene jacket, a lead sheath, metallic tapes, treated braids, Plastex or polyethylene jackets, depending on the insulation used and upon service conditions.

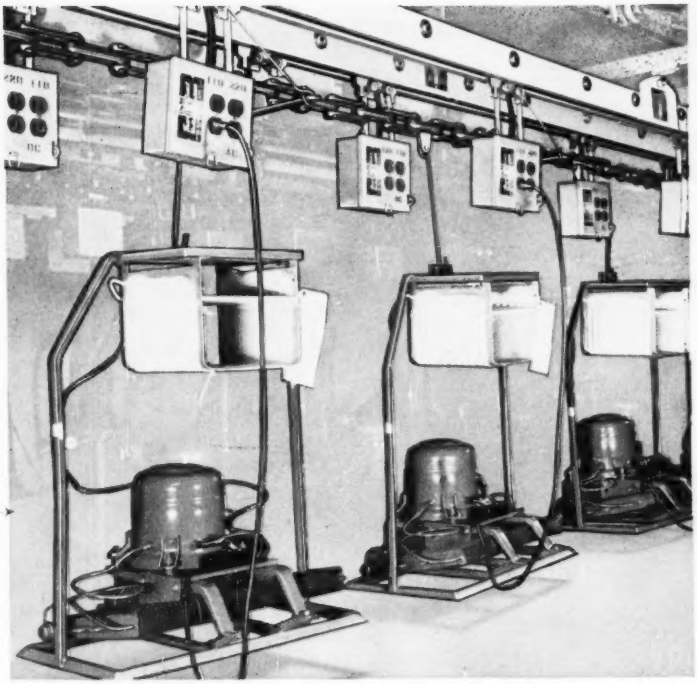
The type of cable and method of installation should be decided upon only after a careful study of service requirements. Simplex engineers are always on hand to help you. Feel free to write for their assistance at any time.

SIMPLEX WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



Cross-sectional view of Industrial Trol-E-Duct and tap-off trolley. Spring-button contacts assure positive contact as trolley rolls on metal wheels astride slotted opening in duct.



Actual installation photograph, showing Industrial Trol-E-Duct with special tap-off trolleys feeding motors on a moving test line. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution Duct • "Plug-In" BUStribution Duct • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

Power that travels with the job

LOOKING for increased efficiency in your production line?

Hook up with electrical power that rolls right along with the job. BullDog Industrial Trol-E-Duct feeds moving cranes, hoists, portable tools, and similar moving "loads".

Power is always where you want it with BullDog Industrial Trol-E-Duct. Smooth-rolling trolley-type outlets glide along a continuous slotted opening in the bottom of the duct, tapping constant power from enclosed bus bars. As a job moves along, power follows.

Where portable tools are used, the moving trolley provides a safe, mobile feeder that eliminates lengthy, cluttering extension cords.

Installed, Industrial Trol-E-Duct is sturdy and dependable. However, should plant changes become necessary, the entire system can be quickly and simply dismantled and relocated to meet the new demands. All parts are 100% salvable.

You'll want to get all the facts about this remarkable power distribution system. Call your nearby BullDog Field Engineer for an appointment. He'll answer your questions and arrange to show you an installation in your neighborhood.

BullDog Field Engineers welcome the opportunity to sit in with you during the early planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation costs, as well as efficiency and reliability in actual operation. Why not take advantage of this service?

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

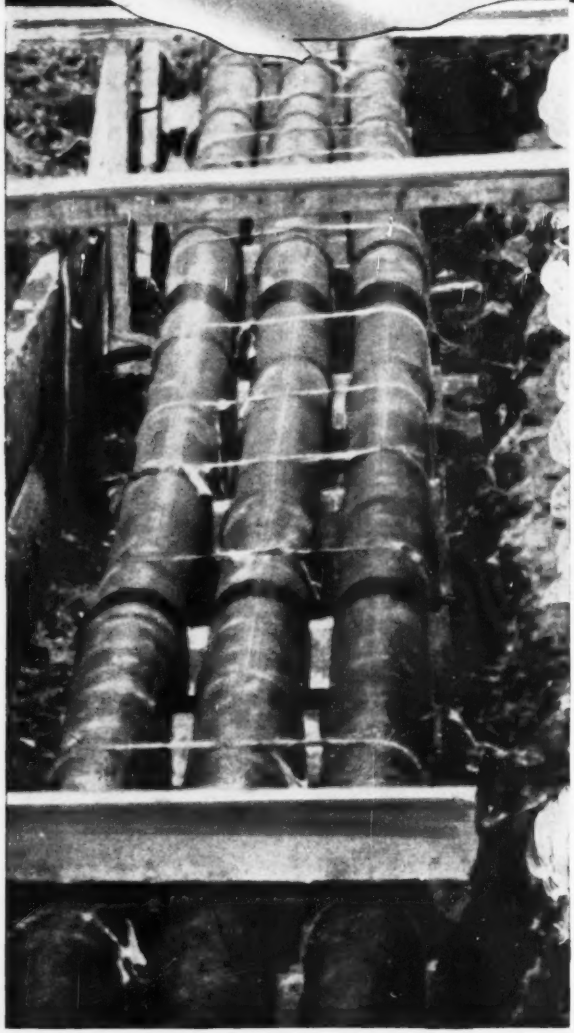
CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue Tel. Garfield 2844
Portland 12, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.

A Tip From The Underground...



Here is the tip-off to all who are interested in the long-term performance of power and communication cables.

ORANGEBURG FIBRE CONDUIT when inspected after 50 years underground proved itself to be as serviceable as on the day it was first installed.

When you install ORANGEBURG FIBRE CONDUIT you protect cables from 1. Cable Sheath Abrasion. 2. Pulling Tensions. 3. Corrosion. 4. Cable Movement. This protection is permanent and all-embracing.

ORANGEBURG is light in weight, easy to handle, transport, install . . . a product of low initial cost and low maintenance . . . a product that resists corrosive ground waters and chemical wastes permanently.

The Electrical Industry has used ORANGEBURG FIBRE CONDUIT for over 50 years as the ideal protection of cables.

The informative ORANGEBURG Catalog No. 49 is yours for the asking. Write today! Keep it for ready reference in your files.

Technical Bulletin A. C. 48 is also available. It explains the use of 5 Angle Couplings with short lengths in place of special long radius bends.

Orangeburg Manufacturing Co., Inc.
Orangeburg, N. Y.

Orangeburg Standard—For installation with concrete encasement.

ORANGEBURG
FIBRE CONDUIT

Distributors—GRAYBAR ELECTRIC CO., INC.
GENERAL ELECTRIC SUPPLY CORP.

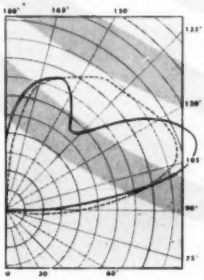
PAT. PEND.

SUNBEAM'S

LOW SURFACE BRIGHTNESS

INCANDESCENT LUMINAIRE

For Schools, Offices, Stores



The SUNBEAM Concentric Ring 2500 Series **leads** the **country in low** surface brightness indirect **lighting**. These **incandescent self-luminous silvered-bowl** units are designed **to provide high-level,** uniform, indirect light, without **glare or shadows for** schools, offices, stores and other similar **installations** where the seeing task is critical. **Remarkably high efficiency is achieved along with** unusually **low surface brightness of 0.3 candles** per square inch **in the shielded zone. Sturdy** in construction, these units are equipped with special alzak reflectors and concentric louvers which have a 300 baked enamel matte white finish. Maintenance is almost negligible. Available in two sizes (20" and 24" diameters) with various standard stem lengths for surface or pendant mounting and using 300 watt to 1500 watt silvered-bowl lamps.

Sold through leading electrical distributors.

For further information and E.T.L. Report write for Bulletin #606.

SUNBEAM LIGHTING COMPANY • 777 EAST 14TH PLACE • LOS ANGELES 21, CALIFORNIA

Tops IN THE MILE-HIGH LEAGUE!

● The Public Service Company of Colorado handles electricity and gas distribution and transmission for its customers in the mountainous north-central portion of the state. For maintenance work, for readings, for "cutting in" new equipment in inaccessible areas where other means of communication are not available, the company finds G-E radio an indispensable, money-saving tool.

This utility's trouble trucks, line trucks, patrol vehicles and compressors, as well as supervisors' cars are in touch with one another and with headquarters at Denver by radio.

J. M. Wissenbach, Engineering Department, shown above, reports that dispatching by G-E radio *materially cuts elapsed time between receipt of complaint and adjustment of trouble.*

General Electric specializes in radio communication systems for utilities faced with difficult problems of terrain or weather. For complete information call the G-E office nearest you or write: *General Electric Company, Box 1122, Electronics Park, Syracuse, New York.*

Before You Select Any Radio Communication Equipment—

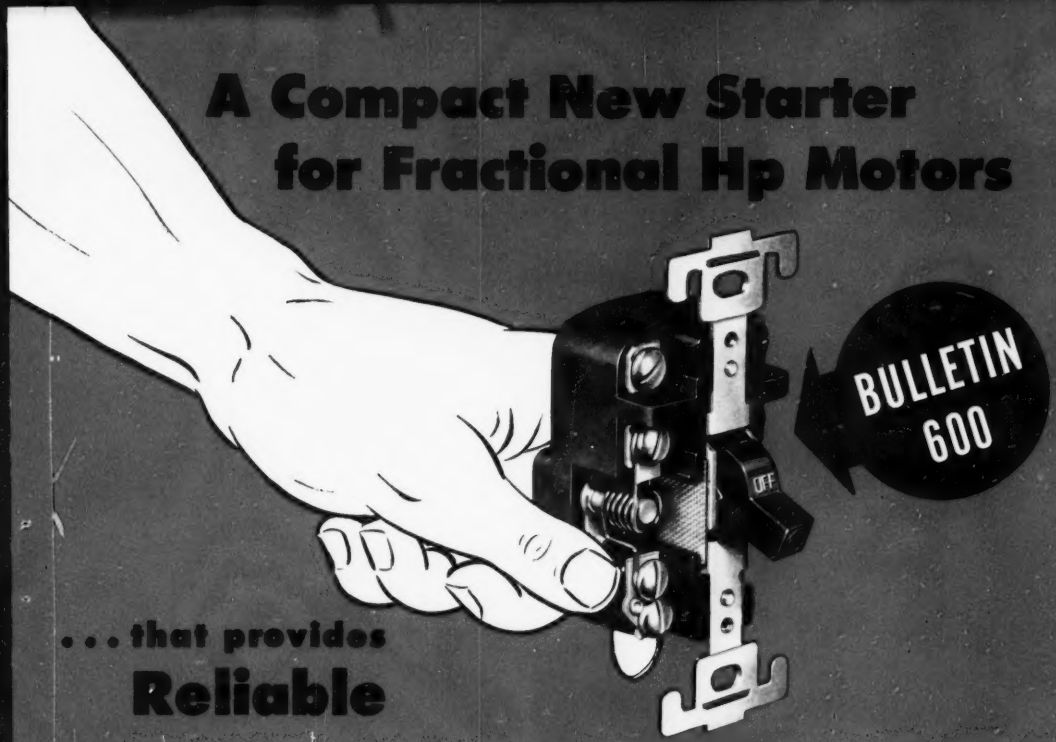
Get This Bulletin FREE!

Colorful booklet about General Electric radio communication will be sent to you on request. Ask for it.

You, too, can put your confidence in—

GENERAL ELECTRIC

A Compact New Starter for Fractional Hp Motors



. . . that provides

Reliable

OVERLOAD PROTECTION

Open view of enclosure for surface mounting

Closed view of enclosure for surface mounting

Bulletin 600 Switch with waterproof enclosure

Bulletin 600 Switch fits any standard switch box

Here is a small, manually operated starter that will satisfy the latest ruling of the National Electrical Code . . . which requires overload protection for a great many fractional horsepower motor applications. The Bulletin 600 Starting Switch is built in the single- and double-pole construction, and is rated one horsepower and less. Its dependable thermal breaker trips the switch under a sustained overload, protecting the motor against burn-out. When the overload is cleared, the breaker is easily reset with the switch lever. However, the switch cannot be held closed so long as the overload condition remains.

The Bulletin 600 Starter is available in enclosures to meet every service requirement. Send for complete data. Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wisconsin.

A-B Quality

ALLEN-BRADLEY

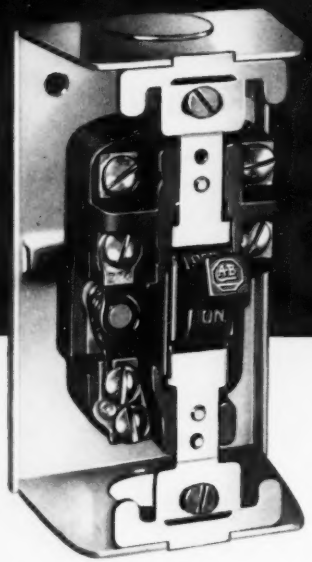
BULLETIN 600 STARTING SWITCHES

QUALITY

SEE OTHER SIDE

SAVE 30% to 40% of INSTALLATION TIME

on Starters for Small Motors (1 hp or less)



BULLETIN 600

Manual Starting Switches with Overload Protection

●

No Need to Remove Starter from Enclosure

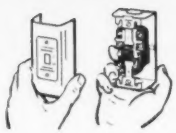
Installation of the Bulletin 600 Starting Switch is so simple that contractors have saved as much as ten minutes in installation time. In addition, they have found the switch exceptionally reliable.

●

GENEROUS WIRING SPACE
ATTRACTIVE APPEARANCE
SIMPLE DESIGN

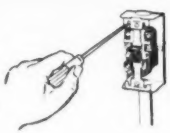
STEP 1—REMOVE COVER

Simply remove two screws on the front of the Bulletin 600 Starting Switch and the metal cover slips off, exposing the front and two sides of the switch.



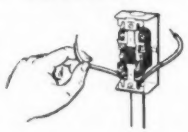
STEP 2—MOUNT UNIT

Mount the switch on the wall with two screws. Conduit openings on top, bottom, and back permit easy connection. No need to remove the starter from the box.



STEP 3—PULL IN WIRES AND CONNECT

Because the compact mechanism allows ample space, wires can be pulled into the box and connected to the terminals without removing the switch from the enclosure.



STEP 4—PUT COVER BACK ON

Finally, with the job completed, the cover is slipped back on, and two screws hold it firmly in place. The entire operation is simple and easy. It saves time and money.

A-B Quality

ALLEN-BRADLEY

MANUAL STARTING SWITCHES FOR SMALL MOTORS

QUALITY

ELECTRICAL BOOKS

POWER CAPACITORS, by R. E. Marbury, 205 pages, 6x9, McGraw-Hill Book Co., $3.50. Covers the fundamental working principles of capacitors, material used in manufacture of power capacitors, and characteristics of completed units. Basis of rating power capacitors and their operating limitations are covered. Selection and use of fuses and breakers to function with capacitor units, and the merits of different means of automatically switching capacitor banks with reference to system requirements, are described. The industrial plant engineer can gain a better understanding of power factor and the gain to be made by proper use to improve power factor.

ELECTRIC AND MAGNETIC FIELDS, third edition, by Stephen S. Attwood, 475 pages, 6x9, John Wiley & Sons, $5.50. Supplements training in the developmental concepts, formulas, terminology and units in electric and magnetic field study. Employs simple mathematics; serves as a background for electronics, advanced field theory, and theory of machine design. Third edition is divided into four parts: the electric field; the magnetic field; the ferromagnetic field, and combined electric and magnetic fields.

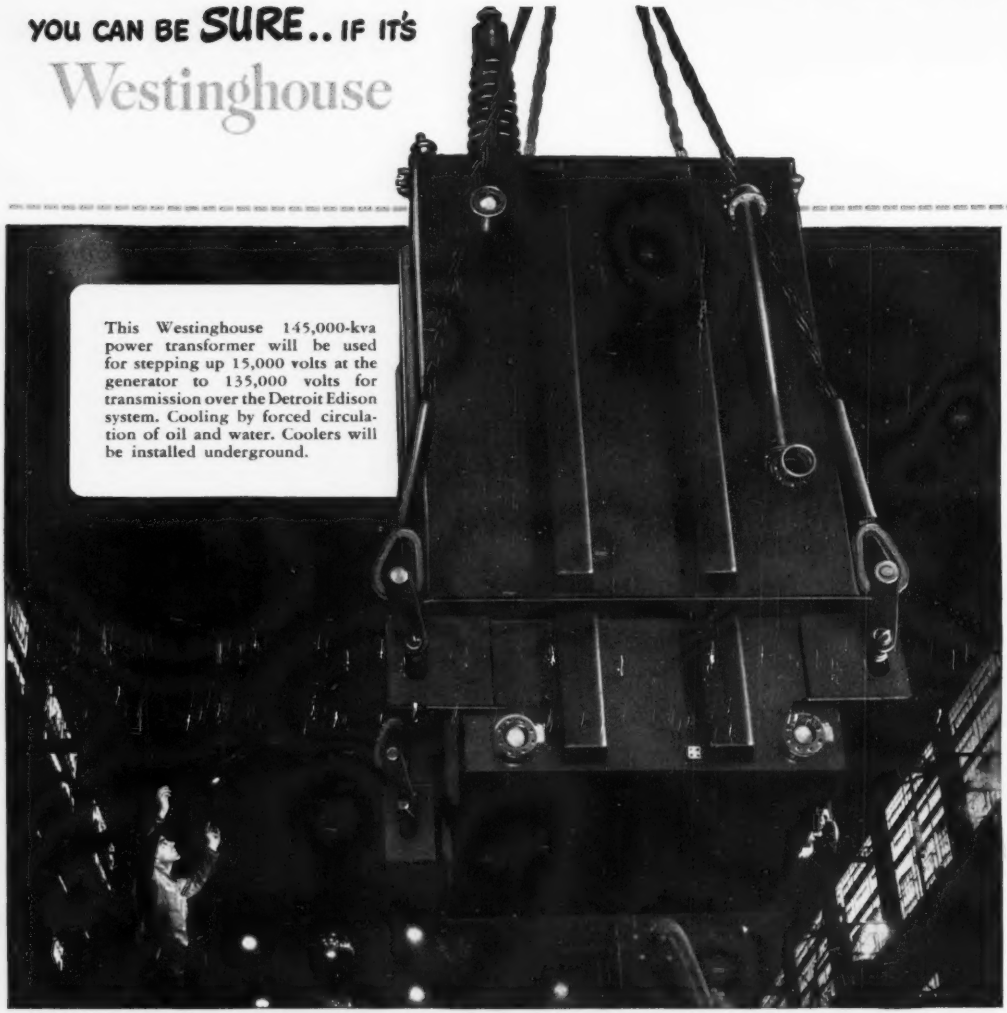
PHOTOELECTRICITY AND ITS APPLICATION, by V. K. Zworykin and E. G. Ramberg, 494 pages, 6x9, John Wiley & Sons, $7.50. Replaces second edition of *Photocells and Their Application*. Presents data on the properties, preparation and applications of photoelectric devices. Emphasis is on practical rather than theoretical aspects of the subject. Formulas involved are included in footnotes; reference material is supplied for those interested in supplementing their information on particular subjects.

MATHEMATICS OF CIRCUIT ANALYSIS, by Ernst A. Guillemin, 590 pages, 6x9, John Wiley & Sons, $7.50. Especially adaptable for use by electrical engineers in electronics and communications. Designed as a source book to supplement the usual undergraduate engineering mathematics curriculum. Appropriate as a textbook in a course in higher mathematics for engineers.

EEI-NEMA PREFERRED VOLTAGE RATINGS FOR A-C SYSTEMS AND EQUIPMENT. A 34-page booklet published by the Edison Electric Institute (EEI Pub. No. R-61, 420 Lexington Ave., and the National Electrical Manufacturers Assn. (NEMA Pub. No. 117), 155 E. 44th St., New York, N. Y. Price 70c in USA, 90c in foreign countries. Represents the long and painstaking work of a joint EEI-NEMA committee on preferred voltage ratings for a-c systems and equipment. The report covers system voltages from 120 to 230,000 volts, and corresponding equipment voltage ratings. Tables included give preferred nominal system voltage ratings for a-c systems and equipment. They are revisions and amplifications of previous EEI and NEMA material on preferred voltage ratings. The joint committee urges those in the industry to study carefully and make use of the new recommendations.

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



This Westinghouse 145,000-kva power transformer will be used for stepping up 15,000 volts at the generator to 135,000 volts for transmission over the Detroit Edison system. Cooling by forced circulation of oil and water. Coolers will be installed underground.

New Developments for Power Transformers of All Sizes

Mechanical Relief Device—relieves abnormal internal pressures more dependably than diaphragm devices and, for the first time, provides accurate and adjustable tripping characteristics.

Type TRO Thermal Relay—introduced to permit accurate thermal calibration and control; fully accessible without breaking transformer seal.

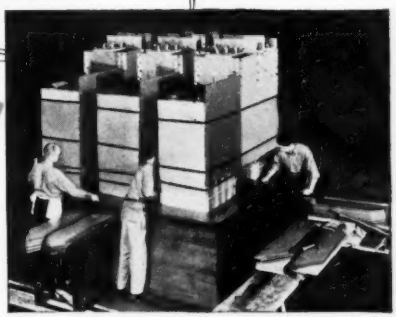
Bracket-Mounted Wheels—permitting a 90° change in direction of movement, usually eliminate need for transfer truck.

Thermosiphon Oil Conditioner—when provided, maintains properties of oil, automatically and constantly.

Type URS Load Tap Changer just announced for moderate ratings; less maintenance, more positive in action and more dependable.

the world's most powerful transformer is Westinghouse

STANDARD-TYPE CONSTRUCTION



Shell-form construction helps to keep transformers small and light . . . facilitates a design which withstands high impulse voltages.

Of many interesting facts about the world's most powerful transformer, this one is the most important to you:

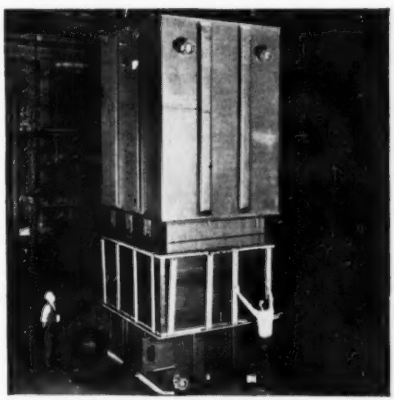
The big unit—from base to bushings—is of standard-type Westinghouse construction!

For purchasers of Westinghouse power transformers, this means extra reliability. For when you buy Westinghouse shell-form, form-fit transformers, you get a design which has proved itself for the largest kv and kva. Or, if your needs call for smaller core-form transformers, you are assured of the same skillful engineering which created the largest.

In producing this remarkable power transformer, no special engineering, special tools or techniques were necessary. The standard shell-form construction with form-fit tank is of such advanced design that it is readily applicable to the Central Station Industry's highest rating requirements now or in the foreseeable future.

Reliable standard construction—suitable to your specific needs—is one way of expressing the standard we sell by.

J-70541

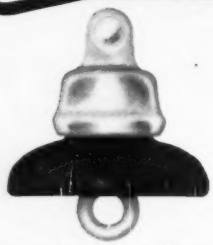


With form-fit tank, you can untank without lifting heavy core-and-coils . . . and in less space.

Westinghouse

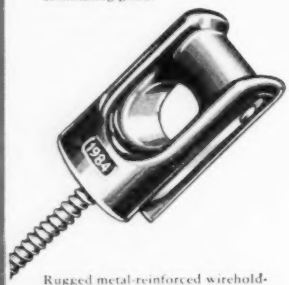
TRANSFORMERS

...for all
HIGH VOLTAGE NEEDS
call
Porcelain Products



Rugged 6" Suspension Insulators—compression glazed for extra mechanical strength. Designed to withstand strain of wind and ice loads.

Pintypes that take a load off lineman's shoulders. Can be furnished with Type "N" radio interference eliminating glaze.



Rugged metal-reinforced wireholders with well rounded wire ways, heavy galvanized steel strap. Semi-float self-aligning action assures proper seating.

SEND YOUR INQUIRY TO
Porcelain Products, Inc.
PARKERSBURG, W. VA.

PRODUCT NEWS

Current Transformer (700)

Allis-Chalmers has announced a 600-volt current transformer, type KLW, for indoor service. It is made with single primary and single secondary; accuracy suitable for one or two watt-hour meters. One high-voltage terminal pad has provision for potential connection to meters. The new secondary terminal block has a shorting device requiring no tools to operate. Clamp-type connectors for the outgoing leads facilitate meter connections. The transparent cover is sealable in either position. This transformer may be used with, or exchanged with, similar transformers of other makes. It is available in 200-, 400- and 600-amp. ratings with the 400-amp. rating conservatively designed to operate continuously at 150% rated current and the 200- and 600-amp. ratings at 200% rated capacity.

Combination Meter (701)

A combination watt-hour and thermal kva. demand meter for use by electric utilities having rate structures requiring kva. demand measurement has been announced by G-E. It is designated as type IHE-IA; is practically the same size as a conventional watt-hour meter; is available in the 50-amp., 240-volt, 3-wire, single-phase rating. According to the manufacturer, it is essentially the same as the 1-50 meter announced last year, except that the rotating element is of the conventional ball-bearing type.

Selenium Rectifier Cells (702)

New high-voltage selenium rectifier cells announced by Westinghouse are designed for a d-c voltage of 24 volts per cell, with an RMS a-c voltage of 33 volts per cell for single-phase bridge circuits. They are available in six round sizes from one to 4¾ in. in diameter, and in 5-in.-square and 4¼ x 6-in. sizes. Principle applications, according to the manufacturer, are radio transmitters, sound and video communication services, vacuum tube power supplies in telephone repeater stations, electrostatic precipitator power supplies, industrial supplies for electronic control, radar and aviation actuator power supplies.

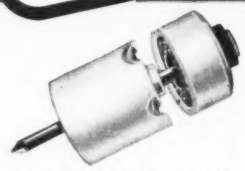
Bus Arrangement (703)

A one-split bus arrangement in its feed-in duct is claimed by Square D to reduce voltage drop greatly in the distribution of power over long distances. Feed-in duct is available in 1,200-, 1,600-, 2,000-, 3,000- and 4,000-amp. ratings, two and three wire single phase, 3-phase and 4-wire service for 600 volts or less. Underwriters' approved.

Plug-In Leads (704)

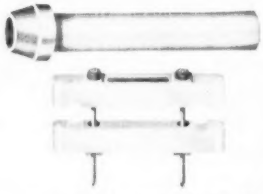
Plug-in leads with a flexible plastic insulation have been announced by Aircraft-Marine Products Inc. They incorporate all types of insulated stranded wire and feature precision positioning of the jack pin, the manufacturer states. The material is not affected by oil, grease, age or sunlight.

...and for
LOW VOLTAGE TOO!
call
Porcelain Products



Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.

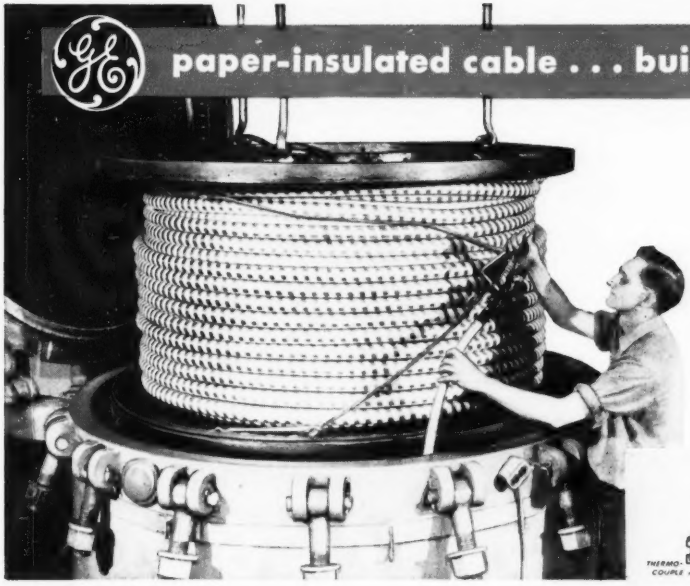
Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.



A complete size range of tubes as well as 2 and 3 wire cleats are available for immediate delivery. Made precisely to give long and satisfactory performance.

Both round and oval type split for-estry insulators as well as telephone insulators are available for immediate delivery.

SEND YOUR INQUIRY TO
Porcelain Products, Inc.
FINDLAY, OHIO



paper-insulated cable . . . built for stability

VACUUM-DRIED . . . *electrically*

—to give uniform quality, long cable life!

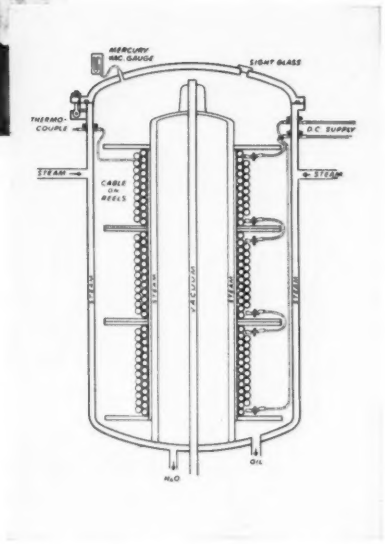
It's only one example, but *electric* vacuum-drying is typical of the extra care that goes into the making of General Electric paper-insulated cable, solid and gas-filled types. By means of this exclusive process, all air and moisture is removed from the assembled cable prior to impregnating, and the cable is heated and dried *uniformly* throughout. This leads to *uniform* quality that assures you of long years of cable service.

Test after test for cable quality!

In many other ways, too, General Electric makes sure of the quality of the cable you get. Over 25 different tests are made on the copper, paper, oil and lead used. Special machines of G-E design, equipped with automatic constant-tension devices, apply paper to the conductors with even-spaced uniformity. Insulation is applied in a special, constant-humidity room, to maintain uniformity of paper tension after moisture is removed.

Complete control for dependability!

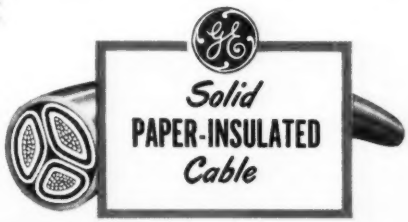
As a further control, each cable is tested 14 different times during manufacture, with over 40 different points checked! With precision methods like these, you can depend on every foot of G-E paper-insulated cable. Check with your local G-E representative on what savings it can mean to you. *Section W36-725, Construction Materials Department, General Electric Company, Bridgeport 2, Conn.*

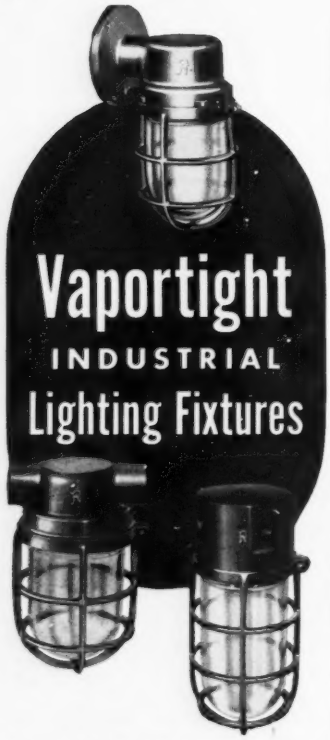


Here's how it's done!

Before impregnating and leading, reels of General Electric paper-insulated cable are placed in a steam-jacketed drying tank, as shown in photo and diagram above. Conductors are attached to vacuum-tight leads connected to high-current generators. The heat generated is *inside* the cable where it is most effective—assuring uniform heating and drying during the vacuum process. Steam, introduced around the tank and in the center dome, maintains constant temperature throughout the tank. Thus—electrically-uniform heating and drying are obtained throughout the cable's length.

GENERAL ELECTRIC





Dependable Lighting in the Presence of Moisture and Non-Flammable Dusts, Gases or Vapors

is assured by the substantial protection built into Pyle-National Vaportight Pylets. Heavy cast metal bases, weathertight sealing, and heavy guards, are features that provide for the most severe operating conditions of industrial service.

The Pylet line includes a complete range of types, including types for conduit and wall mounting, universal 4 and 5-hub types, two and three gang, handrail and outlet box fixtures for 10 watt to 200 watt lamps. Also Midget fixtures, plugs and receptacles, switches, junction boxes and other vaportight Pylets. Consult your Pylet Catalog 1100 for complete listings.

SINCE 1897

THE PYLE-NATIONAL COMPANY

1364 N. Kostner Ave., Chicago 51, Ill.

Pacific Coast Sales Office
25 Beale Street, San Francisco 6, Calif.

Switching Mechanism (705)

A new pole-base switching mechanism is especially designed for ground control of pole-mounted, gang-operated, G-E oil fuse cutouts of any rating; is available for either 2- or 3- phase installations. The mechanism may be used with cutout installations on poles of any height by a field adjustment of the vertical operating member. Metal on and off name plates are provided at the hand-operated lever, permitting an operator to determine the position of the cutouts from the pole base.

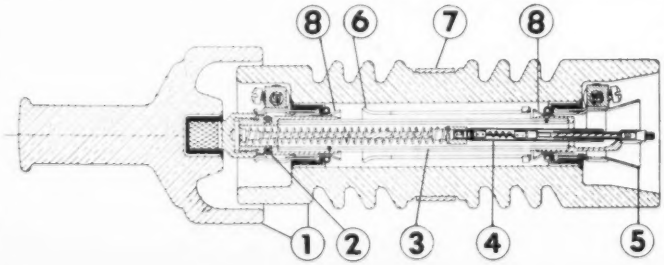
Starters (706)

Ward Leonard has developed Bulletin 3151 size 0 and 1 a-c manual across-the-line starters for application with single or polyphase a-c motors. These starters consist basically of a mechanically actuated quick make and break switch mechanism with thermal overload protection. Components are housed in NEMA type 1 general-purpose enclosures. They are available in 2-, 3-, and 4-pole forms. Maximum enclosed three-phase rating for size 0 starters is 2 hp., 440-550 volts, 60 cycles and for size 1 starters 7½ hp., 440-500 volts, 60 cycles.

Cutout, Switching Device (707)

The new Positect is an enclosed bayonet-type cutout and switching device manufactured by S&C Electric Co. The new Positect (illustrated) has exceptionally high short-circuit interrupting ratings; ability to switch load, magnetizing and charging currents, and safety provisions which nullify ordinary cutout hazards. As a cutout, the short-circuit interrupting range of the Positect extends up to 12,000 amp. r.m.s. asymmetrical. As a switching device, the single act of inserting or withdrawing the handle-and-tube assembly is all that is necessary for switching distribution transformer load or magnetizing currents, or small capacitor bank charging current. During a switch operation, the arc is confined and interrupted within the housing. Safety features resulting from the switching ability described, are: (a) opening under load, either intentionally or inadvertently, is not accompanied by any of the hazards commonly experienced with ordinary types of cutouts. (b) if unknowingly closed-in on a short circuit, the handle-and-fuse-tube assembly does not recoil, and all the discharge is from the arc chute at the bottom of the housing in a direction away from the lineman. The Positect is for application on circuits through 7,200/12,470 GrY; current ratings of 50 to 100 amp.; interrupting ratings of 50 to 100 amp. Mounting bracket is adjustable within a wide range horizontally, and to any one of four positions vertically.

Legend: (1) wet process porcelain handle and housing, (2) gas-operated locking spring, (3) fiber-lined fuse tube, (4) fuse link, (5) arc chute, 6) auxiliary fiber liner, (7) clamp strap for mounting bracket, (8) stainless-steel-spring-backed, silver plated lower contacts.



Constant-Current Regulator (708)

A self-contained type CSP-C constant-current regulator with controls and accessories mounted integral with the tank is offered by Westinghouse. It is stated that the new regulators can be mounted on a pole in shorter time than required for conventional units since only primary and secondary leads and control line need be connected to bushings provided. No additional fuse cutouts, oil switches or protective devices are necessary. These regulators are available in 5-, 7½-, 10-, 15-, 20-, 25- and 30-kw. sizes for operation of a 6.6-amp. secondary from a 2,400-volt, 60-cycle primary. A 2,160-volt tap permits operation with primary voltages from 2,050 to 2,520 volts.

Voltage Regulator (709)

The JFR, a new low-cost pole-type voltage regulator designed by Allis-Chalmers, is said to offer precise ⅝% step voltage control to small sizes of feeder distribution lines. It has plus and minus 10% regulation and is completely self contained with automatic control and line drop compensation. Its quick-break mechanism is built on the same principle of balanced spring design as the company's AFR and DFR station-type regulators and, according to the announcement, will provide as close voltage regulation as the best station-type regulators. It is being built for 10.8-kva., 7,200-volt, 15-amp. service.

Tester Cap (710)

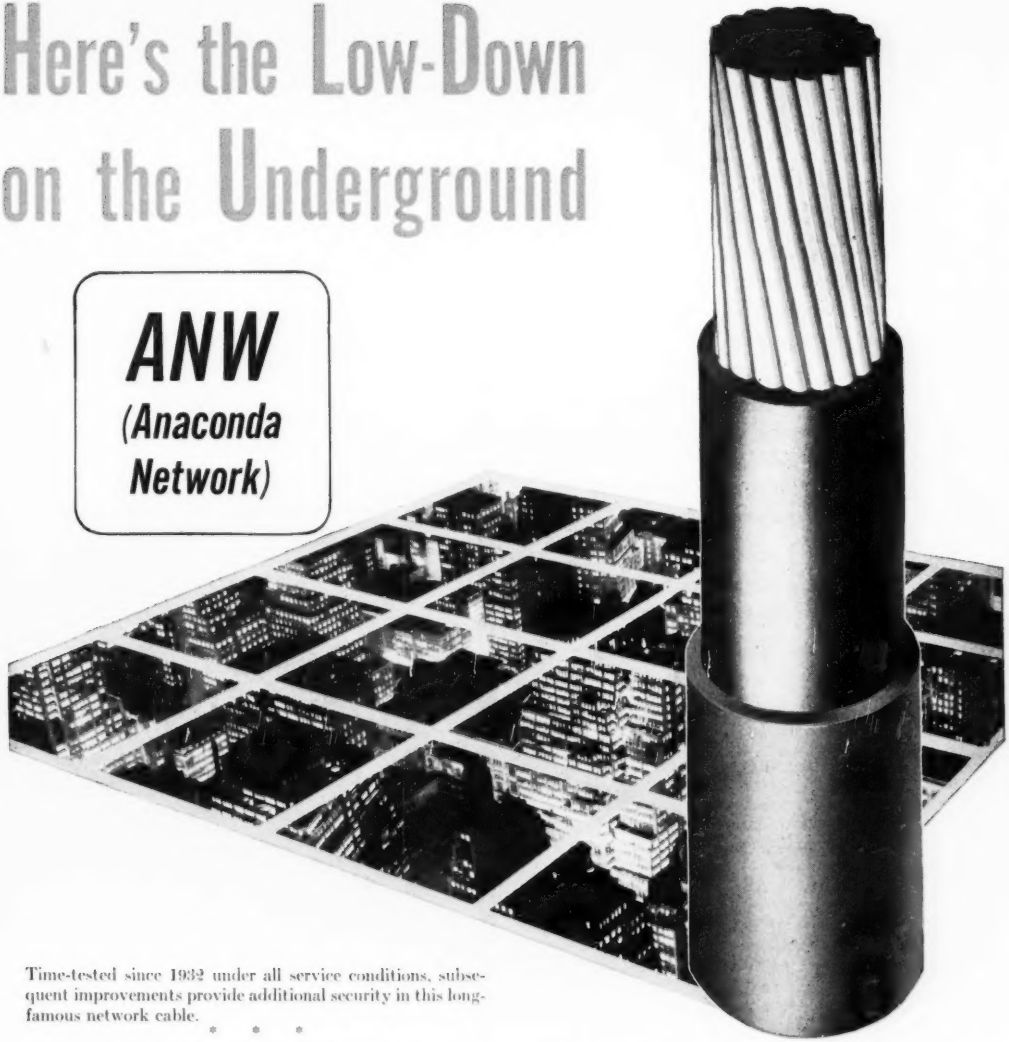
Square D has a new magnetic polarity cap for its voltage testers. Testers are available either with or without the new cap, or caps may be purchased separately and used on earlier-type models. Made of transparent plastic, the new cap screws on top of the tester. It contains a two-color magnet on a rotating shaft, one tester prod red, the other black. When the red portion of the magnet is up, the red tester prod is positive, when the black portion is up, the black prod is positive. The new cap contains no lamps or high-resistive elements, the announcement states.

Capacitor (711)

Cornell-Dubilier Electric Corp. is making type AVL 3204 heavy-duty discharge type capacitor, with capacity and voltage rating of 20,000 mfd., 150 working volts. Over-all dimensions of case are 6x8 in. at the base, 11 in. high.

Here's the Low-Down on the Underground

ANW
(Anaconda Network)



Time-tested since 1932 under all service conditions, subsequent improvements provide additional security in this long-famous network cable.

* * *

Tough, easily handled, Type ANW-insulated, neoprene-jacketed cable incorporates six important advantages . . . important to you for underground duct installation.

1. Better heat and flame resistance—protected by the same neoprene jacket as Anaconda mining cables which must and do meet the severe flame test of the U.S. Bureau of Mines.

2. Higher resistance to duct acids and alkalies—years of experience with Type ANW insulation with only a braid covering showed it to be highly resistant to oils, acids and alkalies encountered in soil and sewage waters. NOW it has the additional protection of the neoprene jacket which itself has shown by test and experience, excellent resistance to these agents of destruction.

3. Higher operating temperature—now 75 C copper temperature, continuous duty.

4. Superior aging—Type ANW insulation has demonstrated year after year . . . and now even better . . . long-aging characteristics under severe oxygen bomb and air bomb tests.

5. Low Moisture absorption—Type ANW insulation has always had low moisture absorption . . . far less than is detrimental to safe operation.

6. More easily handled—passes 180 degree cold-bend test at O C without damage to jacket. Cable is lighter, easier to pull. No lead to fuse, insulation and jacket do not support combustion.

60444

ANACONDA

ANACONDA WIRE & CABLE COMPANY

25 Broadway, New York 4, N. Y.

Report to Power Engineers

Production of New Standardized Switchgear Now Greatly Increased in Allis-Chalmers Switchgear Plant.

Outdoor Switchgear Redesigned for Greater Accessibility, Better Service . . . Welded-In Floor Plates, Full Length Instrument Panels, Better Ventilation, Increased Compartmention.

New Low Voltage Switchgear Simplified. Improved Breakers, Easier Access for Maintenance.

Check This Modern Line of Allis-Chalmers Switchgear For YOUR System Protection Today!

YOU CAN SELECT standardized switchgear for your system quicker with the help of Allis-Chalmers engineers. *Standard* Allis-Chalmers Switchgear is *prefabricated*, wired and assembled. Easy to install, it permits future expansion with a minimum of engineering.

Sturdy, welded steel framework is sheet steel enclosed. Safety-engineered compartments insure complete operating protection.

Circuit breakers are designed for fast circuit interruption, long-life operation. Greater accessibility, elimination of excess component parts means fewer linkages, fewer operating parts. Maintenance is simplified.

These features are a product of 50 years of experienced engineering — a first requirement in reliable protective equipment.

Result: A-C in cooperation with your engineers can advise you on equipment for your fault current, voltage, temperature and other specific requirements.

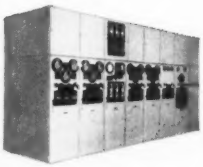
Mail coupon or call your nearby A-C Sales Office for further details.

Ruptair and *Raptor* are Allis-Chalmers trademarks.

Modern Design SWITCHGEAR:

VERTICAL LIFT

5 kv and 15 kv — interrupting capacities through 500 mva. Metal-clad, complete with instruments, instrument transformers, buses, circuit breakers, and control wiring. Used on Ruptair, Oil or Air Blast circuit breakers.



HORIZONTAL DRAWOUT

600 volts ac and 250 volts dc. Interrupting ratings to 100,000 amperes. Dead front, metal-enclosed. Pantograph frame for easy breaker withdrawal. Protective barriers and devices. Single main bus for incoming connections, greater accessibility, and ready inspection.

CUBICLE

15 kv — interrupting capacities over 500 mva. Complete phase segregation with maximum protection for electrical equipment and operating personnel. Stationary air blast circuit breakers.

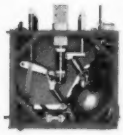
Pioneers in Power and Electrical Equipment From Generation Through Utilization

ALLIS-

on Allis-Chalmers Switchgear

Improved CIRCUIT BREAKERS:

AIR BLAST



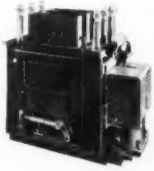
Clears circuits in minimum time. Interrupts arc in less than one cycle. Uses prestored air for operation. Primarily used with metal-clad, vertical lift switchgear. Rated at 15 kv, 500 mva and above.

LOW VOLTAGE AIR

Modernized G-25 and G-50 air circuit breakers for 600 volt service and below. Built for repetitive operation. Insensitive to shock and vibration; adaptable for light currents of low power factor.

The G-25 and G-50 meet all standardized requirements of NEMA, AIEE and other electrical requirements. Equipped with inverse time series overcurrent trip. Stationary or drawout construction. Manual or electrical operation.

MAGNETIC AIR



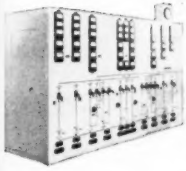
The "Ruptair" circuit breaker is designed for service of 5 kv, 250 kva and below. Individual phase barriers. Self-aligning finger type main disconnects have 360° contact. Completely oilless and self-contained. Employs horizontal contact separation for reliable arc extinction.

OIL

Oil tight enclosed mechanism of low inertia, straight line motion type. Wide application for central station and industrial service. Ideal for economy of space and operation. Equipped with Ruptors to reduce contact burning and oil deterioration. Silver plated main contacts, arc resistant arcing contacts. Oil and gas separator.

Many Types of SWITCHBOARDS:

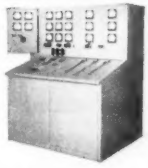
DUPLEX



For centralized control — controls and instruments within easy reach of operator. Segregated relay and operating equipment. Front: control switches, indicating instruments, annunciators. Back: relays, recorders, test facilities. Wiring carried in special troughs, terminal blocks for quick connections, easy inspection.

BENCHBOARD

All equipment in front. Meters, instruments, relays mounted on vertical panel. Control switches, rheostats, etc. mounted on bench section. Doors or removable plates give access to rear wiring and connections. Dead front.



OPEN

Standard switchboard panels for specific applications . . . for control of generators, motors, transformers, rectifiers, feeder lines for all municipal and industrial applications where space is limited and enclosed types not warranted. Includes necessary accessories on front panel. Ready access to rear wiring and terminal blocks.

WRITE OR CALL FOR INFORMATION

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.
Please send me information on:

.....

Name.....

Title.....

Company.....

Address.....

A-2702

A-C ALLIS-CHALMERS

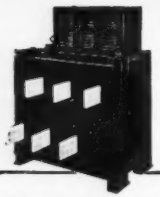
CHALMERS

NEW AIR-COOLED
DISTRIBUTION TRANSFORMERS

POLE MOUNTED — OUTDOOR — ALL-PURPOSE — INDOOR — WALL MOUNTED

LIGHTER! SMALLER! SAFER! MORE ECONOMICAL!

MARCUS SCORES AGAIN IN THE FIELD OF AIR COOLED TRANSFORMERS



AIR-COOLED TRANSFORMERS
1 to 2,000 KVA up to 15,000 Volts to meet Individual Requirements

- DISTRIBUTION
- GENERAL PURPOSE
- PHASE CHANGING
- ELECTRIC FURNACE
- RECTIFIER
- WELDING
- MOTOR STARTING

MTC

From a Pioneer in the field comes a new distribution transformer—AIR COOLED, DRY TYPE. No hazardous oil or toxic liquids to fuss or bother with. The use of superior class B and C heatproof insulation such as fibre-glass, mica, porcelain, new Johns-Manville Quinterra and similar inorganic material results in a transformer that can withstand the overloads that normally would damage an ordinary class A (cotton and paper) insulated oil filled unit. The entire transformer element is seal protected against oil, acids, moisture, etc., and is housed in a sturdy, scientifically ventilated, weatherproof case which conforms with all applicable EEI-NEMA construction standards. This extremely versatile transformer can be used outdoors, pole or platform mounted or indoors at the load center, mounted wherever convenient with no expensive fireproof vault required.

Currently available in sizes to 100 KVA, voltages to 5000 V.

COMPETITIVE PRICES • GOOD DELIVERIES
WRITE FOR BULLETIN #49-ACO

MARCUS TRANSFORMER CO. INC.
40 MONTGOMERY STREET
HILLSIDE 5, NEW JERSEY

PIONEERS IN THE FIELD OF AIR-COOLED TRANSFORMERS

Sales Representatives
W. R. HENDREY COMPANY
Seattle 4, Washington
E. B. COOK COMPANY
San Francisco, California
ROBERT A. YOUNG & COMPANY
Los Angeles 15, California

Circuit Protector (712)

BullDog Electric Products Co. has introduced a new circuit protector, the Pushmatic, featuring positive fingertip control and automatic protection for electrical circuits. This model has no intermediate position and so manual resetting is eliminated. A push of the finger makes or breaks the circuit or restores the power flow when the circuit has been broken by short or overload. Pushmatic is an individual single-pole unit; is available in four types: thermal only, thermal magnetic and both of these with ambient compensation. All types are identical in size, and are interchangeable. BullDog also has introduced the Electri-Center, available in conventional panel style for commercial and residential use and narrow column for industrial installations. It comes in 2-, 4- and 8-unit cabinets.

Capacitors (713)

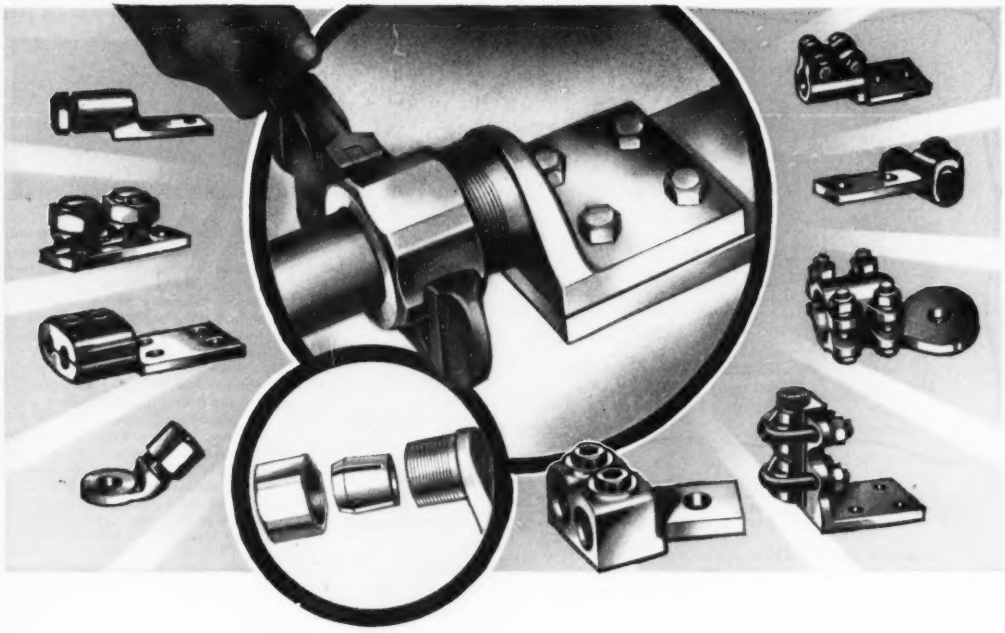
A new line of capacitors, specially adapted to oil filled service but equally usable in industrial plants, has been announced by G-E. Suitable for outside service, the capacitor comes in ratings of 2, 3, 4, 5 and 6 kvar. at 460 volts; may be mounted in any convenient position and is ready to install. Each unit has a 4-ft. flexible flamenol-jacketed cable, including ground wires, with a ¾-in. watertight connector at the end of the cable for knockout connection to the motor starter. If a conduit installation is desired, the connection fitting on the capacitor case may be removed and a standard conduit fitting substituted, the announcement states.

Fitting (714)

Wiremold has redesigned its 1914A connector fitting for entering the back of the 1900 Plugmold multioutlet system. The new design replaces the armored cable connector with a dual-purpose connector which may be used for armored cable or non-metallic sheathed cable. When used with non-metallic sheathed cable, grounding may be secured by wrapping the ground wire around clamping screw. The fitting is 6 in. long, with a 4-in. cover section. Two couplings are furnished.

Plug (715)

A plug manufactured by Thyco Electrical Products Inc. is equipped with finger grips. These plugs are molded of American Cyanamid's Beetle plastic; have finger-sized holes for ease in handling.



You always find the EXACTLY RIGHT TERMINAL—in the Complete line

Shown above, at center, is one of the various Multi-Slit Tapered Sleeve lugs in the Penn-Union catalog. You'll also find E-Z lugs with Post-and-Nut, Vi-tite, Multifit, and numerous clamp types. These pictures can merely suggest the variety.

Below are shown Thread-On, Shrink-Fit and screw types, soldering lugs, a wide selection of sheet metal terminals, etc. *Penn-Union makes the terminal you need.*

Also, Tee Connectors; Cable Taps; Straight, Parallel, Elbow and Cross Connectors; Bus Supports, Clamps, Spacers; Grounding Clamps; Service Connectors, etc.

Penn-Union fittings are the choice of leading users, who have found that *if Penn-Union made it, it's dependable*—mechanically and electrically.

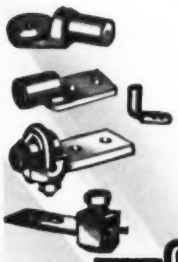
KENNETH ANDERSON CO.
412 Seaton St.
Los Angeles

NORTHWESTERN AGENCIES
4130 First Ave., South
Seattle, Washington

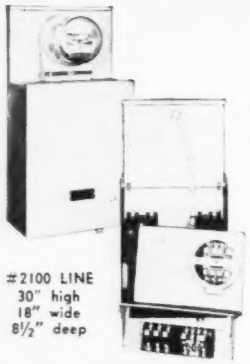
F. M. NICHOLAS CO.
1123 Harrison St.
San Francisco

PENN-UNION ELECTRIC CORP.
ERIE, PA.

The Complete Line of Conductor Fittings



PENN-UNION

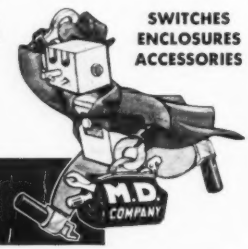


#2100 LINE
30" high
18" wide
8½" deep

SLICK! COMBINATION METER AND CURRENT TRANSFORMER CABINETS allow meter and test switch to be wired in laboratory. Meter panel with test block bridge removes as a unit, see illustration. Single or double meter mounting. Socket or A Type meters.

Ideal for outdoors; perfect for indoor use where wall space is at a premium. The universal low cost cabinet for modern meter departments.

WESTERN SALES REPRESENTATIVES
FRED W. CARLSON, 307 Wall St., Seattle, Wash.
JOHN G. CORRIN, 600 S. Highland Ave., Los Angeles 36, Calif.



SWITCHES
ENCLOSURES
ACCESSORIES

METER DEVICES
COMPANY · CANTON, OHIO

Feature Devices from the KULKA Line

The KULKA SWIVEL-SOCKET *Spot-liter*

No. 168
With 6 ft. cord
Fully wired
Ready to plug-in
660 W-250 V

Used with Spotlight or Floodlight Bulbs up to 300 Watts

DIE CAST BASE WITH ATTRACTIVE STATUARY BRONZE FINISH

—Has Convenience Outlet

A thoroughly engineered, yet handsome appliance. Adjustable to full 90° in ONE OPERATION. The unit is lightweight, yet sturdy—and so steady it won't tip over. Has convenience outlet in base to permit banking without junction blocks and cords. Also has bayonet lock in base to allow use as a pin-up lamp. Ideal lamp for show windows, etc., but also makes fine "sun lamp" or "infra red" lamp for home use.

Write for Circular, or Catalogue of Complete Line

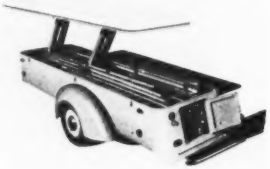
KULKA ELECTRIC MFG. CO.
30 SOUTH ST., MT. VERNON, N. Y.

Suspension Clamps (716)

Porcelain Insulator Corp. has announced a new line of suspension-type clamps, especially designed to minimize line losses at clamping points. High line losses caused by clamps are generally conceded to be traceable to hysteresis and eddy current loss—a condition which costs utilities thousands of dollars in power losses annually. Ability of Pinco's new clamp to reduce such losses to a minimum is credited to the correct combination of metals—clamp bodies of either forged aluminum, cast aluminum-bronze, forged steel or malleable iron together with non-magnetic U-bolts, keeper and cotter bolt. The new clamp line offers four different combinations for use with conductors ranging from .12-in. through 2.25-in. diameter. Five years' service on a test line in Ohio has given definite evidence of the clamp's high efficiency, according to L. B. Harvey, president of The Porcelain Insulator Corp. The new line of clamps known as Pinco Triple "L" (low line-loss) clamps is now in full production and is available for prompt delivery.

Tool Trailer (717)

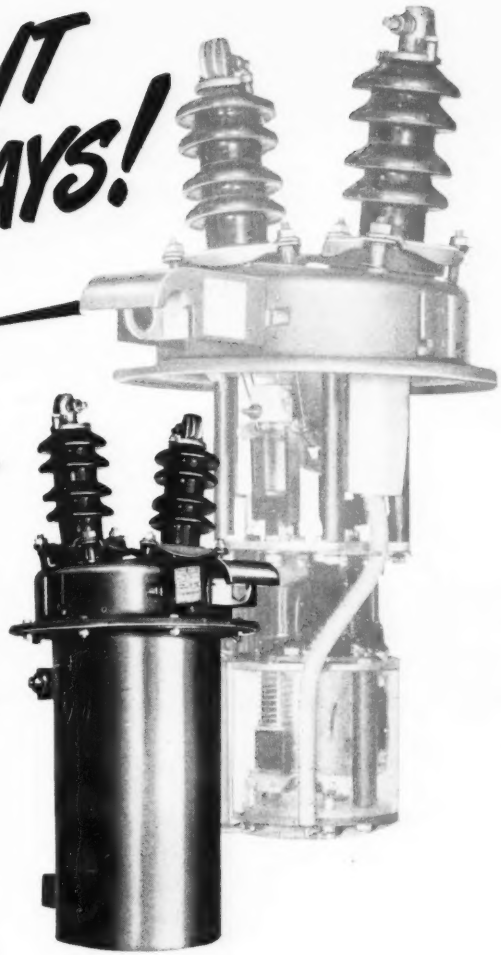
The Chance hot-line tool trailer has four racks of padded, adjustable hooks. An electric heater, which may be plugged in while the trailer is not in use, eliminates need for special drying racks and keeps tools safe for use, the manufacturer states. Built-in troughs and bins provide space for tool accessories, tap clamps, grounding equipment, etc. The one-piece, counter-balanced top will open or close with a 25-lb. lift. A top brace prevents accidental closing. A single rear door with lock-type handle gives additional access to tools. The trailer can be supplied with tools or empty.



Street Lighting Cable (718)

Rome Cable Corp. has developed RoLene (polyethylene) ornamental pole and bracket cable as an addition to its regular line of street lighting cables. It was designed for interior wiring of ornamental poles, fed by underground cables, or for exterior wiring of pole-type bracket fixtures; comes in sizes 10, 8 and 6 AWG. Construction comprises two thermoplastic insulated conductors laid parallel with a belt or jacket of polyethylene over all. Features claimed by the manufacturer are small dimension and lower cost; cleanliness, non-rotting construction.

COMPARE IT THREE WAYS!



The FR-1 Relayed Automatic Recloser

1 FOR MINIMIZING OUTAGES

Fuses and conductors are protected by instantaneous first and second operations—very fast openings—regardless of ambient temperature, viscosity or condition of oil.

- False operations are prevented by precision timing—plus relay control of the interrupter—and, again irrespective of temperature or oil.
- Re-setting is 5- to 15-times faster than other types of reclosers—protecting against rapidly recurring temporary faults, even successive line flashovers by lightning strokes seconds apart.
- Inrush current cannot instantaneously retrip recloser.
- Fewer outages on every score.

2 FOR ECONOMIES IN MAINTAINING SERVICE

Fewer outages mean, of course, fewer service trips. Moreover the unavoidable outages can be located more quickly and service restored in less time.

- With the FR-1, many series fuses can be used to further sectionalize the system with permanent faults always confined to a minimum number of consumers. As many as 4 to 7 different ratings of fuses can be reliably co-ordinated with each rating of recloser because of the established minimum and maximum characteristics of the recloser and year-round accuracy.

3 FOR ENDURANCE IN SERVICE

Oil Blast interruption of arc in ½ cycle means longer life—minimum wear of arc-resisting Elkonite contacts and minimum carbonization of oil.

- Gears of heavy-duty escapement timer are case-hardened and plated. Timer operates in air above the oil, for lasting fidelity of timing and independence from temperature changes or viscosity of oil.
- Coils will withstand continuous current up to two times rating (up to minimum pickup current) without damage—unexpected overloads can't hurt the coils.
- Built-in Thyrite valve element by-passes lightning and surge voltages—protects turn insulation of coils.

Bulletin GEA-4934 describes in detail this unique recloser, gives data on co-ordination with fuse links and tells about its "locked-closed" alternate operating function (convertible in the field) which simplifies and extends co-ordination with fuses. For your copy address your G-E Apparatus Sales Office or write *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

406-24

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.

MAIN PLANT Newark 2, N. J.

GET THE EXACT BRUSH SIZE & BEVEL

FOR YOUR MACHINES

HELWIG CUSTOM-MADE BRUSHES are designed to fit your machines at no extra cost.

HELWIG CUSTOM-MADE BRUSHES have no "field variation" — they're shaped precisely at the factory.

HELWIG CUSTOM-MADE BRUSHES end shutdowns while so-called "standard" brushes are cut down.

To find out how you can save money and man-hours in your shop, call the Helwig office near you . . . today.

TRANSERT BRUSHES

Reduce Ring Wear

Longer life for your rotating machines! The transverse graphite insert gives uniform friction characteristics even with low humidity. And you also get even current distribution, better ring lubrication.

U. S. Pat. 2,105,038

PACIFIC COAST OFFICES

San Francisco	Pier 3, Exbrook 2-8820
Seattle	166 Jackson St.; Elliot 7133
Portland	711 NW Everett St.; Beacon 3368
Los Angeles	611 W. Pico Blvd.; Prospect 8381
Denver	1644 Blake St.; Cherry 4425
Salt Lake City	524 F. St.; Tel.: 3-1600

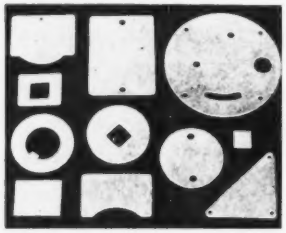
HELWIG SPEER

HELWIG CO., Carbon Products

Makers of Multiflex and Transert Brushes

Fabricated Parts (719)

Under a working arrangement between the Johns-Manville Sales Corp. and H. K. Metal Craft Mfg. Co. for the fabrication of Johns-Manville Flexboard, this material will be available to manufacturers in complete component parts to meet exact specifications. Already used as a general building material, this Flexboard is a composition of asbestos fibers and cement, in sheets of thicknesses from $\frac{1}{8}$ to $\frac{1}{4}$ in. One side is a smooth, hard surface, comparable to carefully dressed lumber; the other side is



honeycombed, an advantage in applications where heat dissipation is a factor. It is approved by Underwriters' as an incombustible material, is a non-conductor of electricity when dry, and is unaffected by exposure to, or immersion in, water.

Insulation (720)

A new varnished Fiberglas insulation announced by Irvington is said to give higher dielectric strength and greater flexibility because of a new principle used in weaving the base cloth which allows better penetration of insulating varnish between fibers. The style OW varnished Fiberglas is available in three thicknesses, .007, .010, and .012 in.; in two colors, black and yellow. Three sizes are: rolls—25 and 50 yd. long, approximately 36 in. wide; tape—in widths from $\frac{1}{2}$ in. up.

Slot Insulation (721)

Irvington has introduced a slot insulation, known as Irv-O-Slot and employing a newly developed binder for bonding the varnished cambric to the paper stock. According to the manufacturer, this binder will not harden with age, nor ooze out under heat; nor will the laminated insulation migrate or delaminate. Tests show the material will withstand 288 hours at 150° C and retain its bond without migrating, it is stated. It is available with Irvington straight-cut or seamless bias varnished cambric bonded to either fish paper or rag stock.

Heater-Speaker Unit (722)

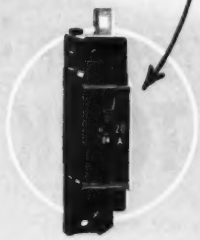
A heater-speaker unit has been developed for use in drive-in theaters. It is designed to hang on the inside of a car window and is said to keep the temperature in the car at a comfortable level in relatively cold weather. A special fuse permits the heater to be disconnected in the summer without interrupting operation of the speaker. It is manufactured by Theatrecraft Mfg. Co. and contains General Electric components, including a circularly shaped 250-watt Calrod tubular heater and a 5¼-in. speaker with metal base voice coil. The complete unit measures approximately 4x7x12 in.

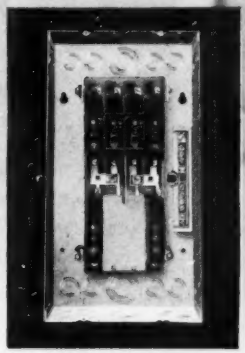
Murray
MODERN METHODS *mean Highest Quality . . . Latest Design . . . Greatest Value!*

8 Circuits *in* 1 Load Center

With the World's Most Satisfactory Overload Protection:

Murray
FULLY MAGNETIC Circuit Breakers





Eight branch circuits are controlled and protected by this NEW Murray Magnetic Circuit Breaker Load Center. Utmost flexibility is achieved by *individually interchangeable* single pole breakers rated at 10 to 50 amp. Range Circuits can be accommodated by 35 or 50 amp. circuit breakers. Surface or flush mounting.

Now you can anticipate two of tomorrow's needs today: (1) more circuits, (2) better protection against overloads. Both requirements are met in the NEW Murray 8 Circuit Magnetic Breaker Load Center!

This modern new equipment brings you the latest in satisfactory overload protection — at moderate cost. As few as four breakers need be installed with the panel . . . more can be added as circuits are added! Any *individual* breaker can be interchanged with a breaker of different rating — making possible unlimited combinations, right on the job . . . and the only tool needed is a screwdriver!

In addition, each Murray *Fully Magnetic* Circuit Breaker is virtually an electrical engineer at the switch! Just see what it does: It carries full rated load indefinitely — *no derating necessary*. It accommodates heavy momentary overloads — even when carrying full rated current. Yet it trips reliably, in a reasonable time, under sustained overloads. It interrupts the circuit almost instantaneously under "short circuit" conditions. *And because it has no thermal element, it is virtually unaffected by ambient temperature changes!*

Yes, you can equip today for the loads of tomorrow — and for tomorrow's exacting standards of overload protection—with the NEW Murray 8 Circuit Magnetic Breaker Load Center. For full details, contact your Murray representative, or write

Murray MANUFACTURING CORPORATION

50 Years of Service to the Electrical Industry

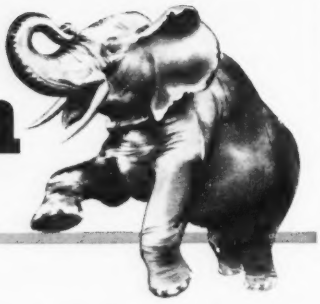
1250 ATLANTIC AVENUE • BROOKLYN 16, NEW YORK

FOR TOMORROW'S LOADS . . .

Equip Today!

SERVICE ENTRANCE & METER EQUIPMENT • MAGNETIC CIRCUIT BREAKERS
SWITCHES • CURRENT LIMITING REACTORS • CROWS' NEST AERIAL LADDERS

Tough



TOUGH WIRE

TOUGH INSULATION

FOR TOUGH WINDING JOBS

High tensile strength eliminates wire breakage.

High abrasion and shock resistance assures ability to wind compactly at high speeds and around sharp radii without film damage.

Toughness can still be had with wire that is soft and ductile.

To prove it, specify Essex Extra Test Magnet Wire for your tough winding jobs.

ESSEX WIRE CORP.

FORT WAYNE 6, INDIANA

WIRE SX PRODUCTS

Plants: Fort Wayne, Indiana; Detroit, Michigan; Anaheim, California. Warehouses* and Sales Offices: *Atlanta, Georgia; *Boston, Mass.; *Chicago, Ill.; Cleveland, Ohio; Dallas, Texas; Dayton, Ohio; *Detroit, Mich.; *Kansas City, Mo.; *Los Angeles, Calif.; Milwaukee, Wis.; *Newark, N. J.; Philadelphia, Pa.; *Portland, Oregon; *St. Louis, Mo.; *San Diego, California; *San Francisco, California.

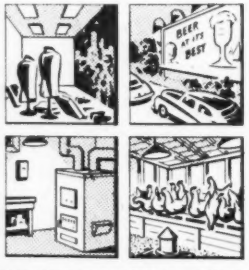
EXPORT SALES OFFICE—LIONEL-ESSEX INTERNATIONAL CORPORATION, 15 E. 26th ST., NEW YORK 10, N.Y.

SWITCH "ON" • REGULARLY
SWITCH "OFF" • AUTOMATICALLY
• ELECTRICALLY

WITH A FAMOUS **TORK** TIME SWITCH

PLAIN OR ASTRONOMICAL

Tork Clock Time Switches are world renowned for their dependability and accuracy. They require no regular attention, and are available in many electrical capacities for both indoor and outdoor use.



There's a TORK CLOCK for every need. Economically priced from $9.50

Send for free literature.

NEW! SPECIAL FEATURES

TORK

ASTRONOMIC "FOLLOW the SUN"
30 HOUR SPRING RESERVE.

CLOCK CO., Inc.

1 GROVE ST., MOUNT VERNON, N. Y.

Welders (723)

A new line of a-c arc welders, featuring increased welding range and stepless precision current control, is being offered by G-E. The new welders are available in 200-, 300-, 400-, and 500-amp. models for indoor manual welding; 750- and 1,000-amp. models for machine and submerged melt welding. A special 200-amp. model is for light-duty, job-shop welding. The 300-, 400- and 500-amp. models are offered also in weather-resistant enclosures with Idlematic control for indoor and outdoor operation.

Line Clamp (724)

Burndy is offering a tin-plated copper alloy line clamp for connecting copper, Copperweld, ACSR, steel or combinations of these conductors. It is recommended by the manufacturer for light duty in rural distribution or similar service; features interlocking fingers designed to accommodate a large range of cable sizes. High gripping pressure is provided by a plated steel bolt. It is catalog number UC-L.

Pole Guard (725)

The Chance safety pole guard prevents the power line pole from touching energized lines when it is being raised or lowered through them. According to the manufacturer, with this guard it is safe to remove or replace poles from hot lines operating at 45 kv. between phases. It is constructed so that the minimum air space between the line and the pole is $2\frac{1}{2}$ in. Each pole guard is tested to withstand 75,000 volts per foot.

Stripping Tool (726)

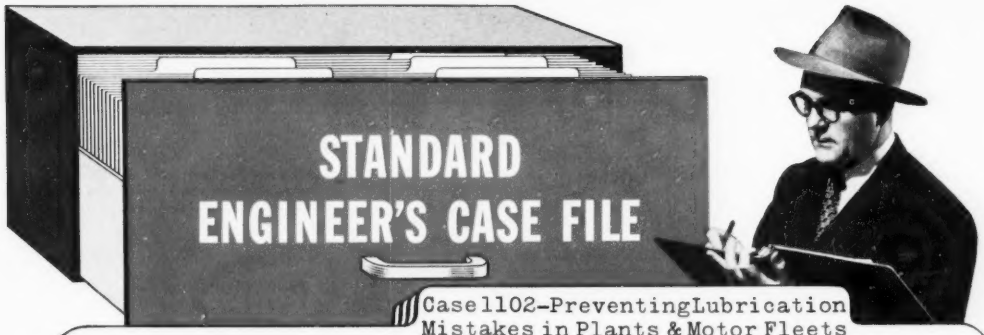
Holub Industries Inc. has developed a stripping tool for removing insulation from 300-ohm TV and FM twin-lead wire in one operation. Both conductors are stripped in one quick squeeze of the handles, the announcement states. This tool also strips No. 16, 18, 20, 22 single-conductor wires without changing blades.

Lighting Line (727)

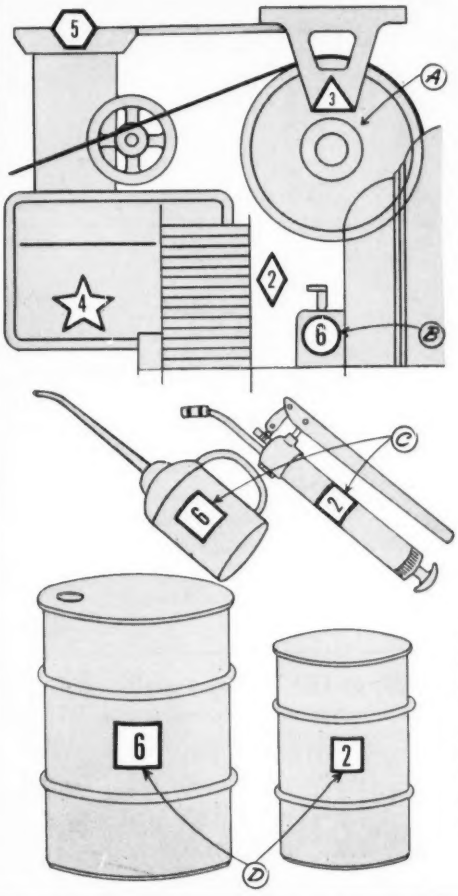
Curtis Lighting, Inc., has announced three additions to its line: the Store-Liter, a steel and plastic unit utilizing two T-12, 96-in. fluorescent Slimline lamps; the Wall Strip, a decorative luminaire using one 40-watt T-12 F lamp; Punchy, for use with one PAR-38, 150-watt projector flood or spot lamp.

Fan (728)

Edwin F. Guth Co. has restyled and redesigned its air circulator, the Guthfan. It comes in close ceiling and suspended models and in combination with luminous bowl lighting fixtures. The original "complete cycle" circulation is retained.



Case 1102—Preventing Lubrication Mistakes in Plants & Motor Fleets



Many operators of plants and fleets in the West have practically eliminated operation delays due to improper lubrication or use of wrong lubricants, by installing Standard of California's free, coded system of planned lubrication. The system employs symbols instead of colors to indicate lubrication intervals -- stops mistakes caused by color-blindness, faded colors or changed appearance of color in different lights. Available for plants and fleets in the Seven Western States.

A. Black-on-white decalc symbols show desired lubrication intervals at a glance. Are placed directly on machine at lubrication points.

B. Numbers on the decalcs indicate the kind and grade lubricant to be used at each point. Chart card on each machine gives meanings of symbols and numbers.

C. Lubricant number-decalcs on dispensers identify lubricant in each dispenser and prevent its use in wrong place.

D. Lubricant number-decalcs on barrels, cans or other storage show kinds and grades of lubricant in stock.

All decalcs, chart cards and other material for the Standard Coded System of planned lubrication, and installation of the system are free. On request, a Standard Fuel and Lubricant Engineer from Standard Technical Service will survey your plant or other operation any place in the Seven Western States. He will make recommendations, give expert advice and install the Standard Coded System if you desire it.

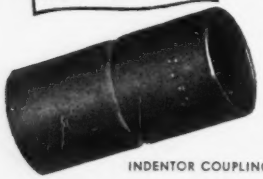
Trademark Reg. U. S. Pat. Office

STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush St., San Francisco 20, California.

CALOL

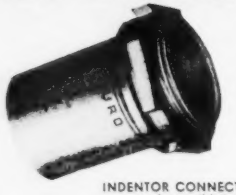
FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

DURO
The All-Steel Line



INDENTOR COUPLINGS

Precision-Made CONDUIT FITTINGS



INDENTOR CONNECTORS
(one piece solid steel)

CUT YOUR COSTS RIGHT DOWN THE LINE

DURO quality Fittings are competitively priced . . . and save you money on installation, replacement and maintenance. Each DURO product exceeds the minimum standard required for approval.

DURO Fittings are made to exacting standards on precision screw machines—properly gauged—full clean threads —cadmium or zinc plated.

DURO offers a complete size range of EMT Fittings . . . Threaded and Threadless Unions — Adapters — Reducers — Nipples — Explosion Proof Unions — Entrance Fittings — Combination Couplings . . . Locknuts . . . Bushings . . . Flex and Cable Fittings.

DURO products are made in the West by a Leading Western Manufacturer and are distributed by qualified wholesalers throughout the West. IMMEDIATE DELIVERY—ALWAYS — ANYWHERE IN THE WEST.

Complete catalog on request.

MULTI-PRODUCTS MANUFACTURING CO.
2040-46 SANTA FE AVE • LOS ANGELES 21, CALIF.
CONNECT WITH DURO AND YOU CONNECT WITH THE BEST

BULLETINS ETC.

Switches (729)

General Switch Corp. has a new 68-page technical catalog of its line of enclosed safety switches, service entrance equipment, panelboards, wireways and fittings.

Catalog (730)

National Electric Products Corp. has published catalog 598 to describe and illustrate its line of Plug-In strip. Included are type CF-2 for commercial applications and type CF-3 switch-controlled, for residential use.

Transformers (731)

Marcus has issued a 4-page bulletin on its line of air-cooled distribution transformers.

Grounding (732)

National Carbon Co. has a new descriptive folder on its ground anodes and backfill material for use in cathodic protection and electrical grounding.

Hardware (733)

Locke is offering a 32-page booklet, the RM Handylog, listing insulator and suspension hardware for power transmission, distribution lines and stations.

Overhead Fittings (734)

Ohio Brass has prepared data sheets on its fittings for overhead systems.

Fuse Puller Switches (735)

A new folder has been prepared by Trumbull Electric Mfg. Co. on streamlined fuse puller switches to be used as residential panels for main, range and lighting circuit protection with terminals for water heater connection.

Switches (736)

Pacific Electric Mfg. Corp is offering catalog 125 on TW-20 and TW-30 large-capacity outdoor air switches, group operated, rotating insulator type; 7.5 15, 23 and 34.5 kv, 2,000 and 3,000 amp.

Fuses (737)

Trico is offering broadside 300-A describing fuses, fuse clip clamps, test clamps, fuse pullers and lubrication devices.

Motor Control Line (738)

In a 22-page bulletin, Trumbull describes a new line of magnetic motor control, intended to give full protection against damage from overload and under voltage to a-c motors up to 50 hp.

Equipment (739)

The Unistrut catalog 500 lists the company's products and includes information on framing, hanging, supporting and mounting equipment.

Lighting (740)

Day-Brite has issued bulletin 30-B covering its Tur-A-Top industrial units.

Marshall Plan Sales (741)

A chart illustrating the manner in which American industrial firms can benefit by Marshall Plan sales to participating countries is available from Westinghouse.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

700	701	702	703	704	705	706	707	708
709	710	711	712	713	714	715	716	717
718	719	720	721	722	723	724	725	726
727	728	729	730	731	732	733	734	735
736	737	738	739	740	741			

Name . . . . . Company* . . . . . Title* . . . .

Address . . . . . .

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

OHIO BRASS COMPANY

BARBERTON DIVISION - BARBERTON, OHIO, U. S. A.

TO: **PENNSYLVANIA TRANSFORMER CO.**

FOR: **CARNEGIE-ILLINOIS STEEL CORP.**

These two 69-22-kv Pennsylvania transformers supply a total of 50,000 kva for one 70-ton electric furnace, two 35-ton furnaces, plus large blocks of power for auxiliary equipment, located at the Duquesne Works of Carnegie-Illinois Steel Corporation. Some of the highlights of these unusually heavy-duty units are . . . "Pre-compressed coils, detachable uni-row radiators, straight line tap changers" . . .

AND (B) BUSHINGS . . . . ONE OF THE FINEST COMPONENTS OF ANY TRANSFORMER

Ohio Brass

2988-H

MANSFIELD, OHIO

ELECTRA'S HUSBAND

WHAT ABOUT THAT LABOR MONOPOLY?

"HOW would you like to eat down town for the next week?" Electra asked when I walked into the house one afternoon recently. "You can also get a room at one of the hotels. I'm going to take some time off to stabilize things around here."

"You must be nuts," I muttered. "Where did you get this idea?"

"Well, if John Lewis can do it, I guess I can also," she said. "You say you're putting on too much weight. That might impair your health and our joint welfare. So I figured that the thing to do was to close up this place and let you stabilize your weight with some restaurant cooking. Besides I just don't feel willing or able to get things done around the house. Hence we'll just shut things down until I think conditions are better."

"You've overlooked one other point," I said with just a touch of sarcasm. "When do we start negotiating about finances?"

"Now that you mention it, that's a good point too," she continued. "I could use more money because, with prices what they are, my purchasing power is too low. All kidding aside, though, what would happen if the mine owners got together and agreed to shut the mines down for a period of stabilization?"

"The same thing that would happen to me if I came in and said I was going to quit work and that you would have to shift for yourself," I answered. "You'd have a lawyer and a divorce suit that would have me in jail if I didn't support you. And the government would crack down on the mine owners but hard and quickly with antitrust proceedings and injunctions against an illegal conspiracy. There are laws that protect you and the public from any such foolishness."

"Well why doesn't the government crack down on Mr. Lewis?" she queried.

"Don't be so naive, my dear girl," I said. "Mr. Lewis can do what he pleases. He can say that the mines must remain closed weeks or months so that coal will become scarce and he can drive a better bargain for higher wages or more holidays and bigger pensions. He can do all of this because he alone controls the United Mine Workers Union. Thus he has an absolute monopoly which he can use without fear of government interference. There are no antitrust laws to threaten him. The courts and Congress just don't recognize that kind of a labor monopoly.

"Mr. Lewis is not alone in the exercise of this monopoly power. Other unions through their leaders can interfere with the production of goods or services that are equally as vital as coal to the public health and safety. And they have used this power in the past. That was why Congress reacted to public pressure and enacted the Taft-Hartley law. This law aimed to stop such abuses and to accord the American public some measure of protection against strikes which threaten public welfare."

"But isn't Congress going to repeal the Taft-Hartley law?" Electra interrupted.

"Maybe," I answered. "But for my money Mr. Lewis has taken care of that. This latest move of his to stabilize things without calling it a strike, ought to convince the members of Congress that this monopoly power must be curbed. It could be that Mr. Lewis has performed a public service by once more emphasizing the viciousness of this monopoly power."

"Wait a minute," Electra said. "Isn't this business of making and delivering electricity a monopoly also? How can you have good monopolies and bad monopolies?"

"In the case of the power industry the monopolistic character of the business stems from a public franchise," I said. "Utilities are granted a monopoly because from the very character of their business it is the most economical and efficient way of obtaining the particular service. The wasteful aspects of competition are eliminated. But all of this is done under a form of public regulation that aims to protect the public at all times. And finally there is a very real competition that keeps the utilities constantly working to improve their service and to lower its cost. That is the threat of government competition. If the people don't like a utility or the service it renders, they can take it over and go into the business themselves.

"Mr. Lewis and his miners submit to little or no regulation by anybody. Furthermore they have no competition. So they use their monopoly power to the very utmost to achieve whatever ends they deem most opportune."

"What chance has the public under such circumstances?" Electra asked.

"Only the protection that courageous legislators enact into laws," I answered. "The repeal of the Taft-Hartley law will remove what little protection there is now unless a substitute measure is enacted by Congress?"

"I guess I'll send Senator Knowland and Senator Downey each a postcard," Electra mused.

"BY the way," said Electra. "You will recall our discussion about television. Well, Mrs. Emery was telling me about the experience of some friends of theirs with television. It seems television disrupted their whole household. Lack of outdoor play was affecting the childrens' health. They were becoming irritable, appetites were waning, schoolwork was being neglected and they were staying up entirely too late." "What did they do?" I asked.

"I'll tell you what they did," said Electra. "The man had to issue an edict. Television only from six to eight, and only then providing outdoor play had not been neglected, schoolwork had been done, dinner eaten, and there were no arguments about going to bed. So you see, that is what television did in that home," jibed Electra.

"Well, so what," I said. "It only goes to prove what I said before. Anything so revolutionary as television is bound to bring about certain adjustments. In this case, it seems to me the family adjusted itself very nicely. These things always work themselves out. Don't be a diehard, my dear."

INSTANT BREAKER OPERATION UNDER ALL FAULT CONDITIONS!

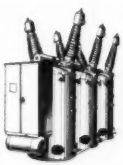
MECHANICALLY TRIP-FREE action instantly releases contacts from closing force when closed on a fault . . . permits high contact acceleration *unhindered by closing cylinder back-pressure or toggle inertia* on pneumatically operated breakers. You get instant, complete contact opening under all tripping conditions.

With this Allis-Chalmers electro-pneumatic operator, highest possible system stability and service continuity are maintained. The breaker cannot be held closed on a fault . . . and operator mechanism is quickly recoupled to permit fast reclosing — within 20 cycles. Pneumatic operation furnishes reliable, high speed contact closing — requires only fractional horsepower motor.

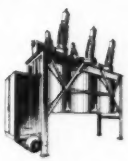
This mechanically trip-free operator is just one of many standard features you get on Allis-Chalmers oil circuit breakers. For details on any rating, contact your nearby A-C representative. Or write direct.

ALLIS-CHALMERS, 939A SO. 70 ST. A-2772
MILWAUKEE, WIS.

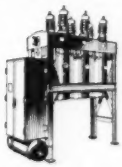
IT'S STANDARD EQUIPMENT ON THESE ALLIS-CHALMERS OIL CIRCUIT BREAKERS



TYPE BZO-160 . . . from 69 to 230 kv — 3 or 5-cycle opening, 20-cycle reclosing.



TYPE FZO-151 . . . 69kv . . . frame-mounted—5 or 8 cycle opening, 20-cycle reclosing.



TYPE FZO-150 *Unitop* . . . 15 to 46 kv — 8-cycle opening, 20-cycle reclosing.

Unitop is an Allis-Chalmers trademark.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment From Generation Through Utilization

Another KEARNEY Triumph

A New Low-Cost Secondary Fuse Cutout

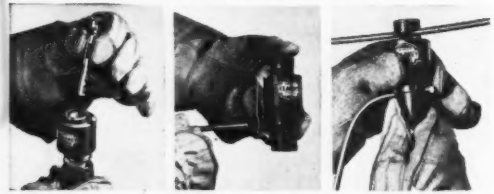
- **Isolate service entrance faults**
- **Protect transformers from secondary faults**
- **Make banking of secondaries possible**

The demand for this Secondary Fuse Cutout was brought about by the successful use of Kearney Secondary Fuse Links.

Sturdily made of weather-resisting, non-metallic material (except for fuse link and spring), this unit transfers current from the secondary to the tap directly through the link itself with no intermediate connection or transfers.

The simplicity of design, without nuts or bolts to tighten, makes it possible to refuse and install this cutout in less than twelve seconds.

Just 3 Easy Steps to Refuse



STEP ONE: Drop the fuse link in the top opening of the cutout. Then, compress the lower shell and insert the tap wire in the hole provided in the link.

STEP TWO: Compress top shell and twist to the right or left so that it stays in the open position.

STEP THREE: Hang the cutout on the secondary, release top shell by twisting to make the final pressure contact with the secondary.

FOR BETTER CONSTRUCTION AND MAINTENANCE

Always Specify KEARNEY PRODUCTS *for the Job*

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

4224-42 CLAYTON AVE. – ST. LOUIS 10, MISSOURI

Canadian Plant, Guelph, Ontario

125 West Coast Distributor: **MAYDWELL and HARTZELL, INC.**

JULY 1949 Vol. 103, No. 1

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

LESSON IN ECONOMICS:

More Production—More Purchasing Power

Stanley M. Johns*

Los Angeles District Manager
Westinghouse Electric Corp.

HOW best can the worker's purchasing power be increased?

The question itself is simple and elementary—unfortunately the source materials from which the answer must be shaped are complex and sometimes mystifying. Yet the very safety and economic health of our nation and our American way of life may depend upon finding the true answer to that simple-sounding question and having that answer understood and accepted by the great mass of our population.

Whatever plans or measures are proposed for increasing worker's purchasing power must be compatible with the economic facts of life and with sound principles. Unless the proposals will meet the practical tests, the plan will not work no matter how desirable its social and economic objectives may be. Overstressed steel will break, no matter how eloquently and plausibly the designer may defend his design. Remember too that many models or pilot plant operations have looked good and even practical and then failed miserably when tried in full-scale operation.

Let's consider again the topic of this discussion — how best can the worker's purchasing power be increased? The answer is simple—just raise wages and lower prices. Anyone will agree to that and any man on the pay roll can understand the logic of it. Naturally he wants higher wages and he wants to spend less of those wages for the necessities of life. Because that is the answer and because it can be easily explained to all, this theory has become the key of the labor unions' program to try to increase the worker's purchasing power.

If it could be done in this simple fashion—by increasing wages and lowering prices, we could stop right here. But the answer is not as simple nor as complete as is indicated. It requires one essential condition. If the worker's real purchasing power is to be increased his *power* to buy the things he needs must be increased. That *power* consists of two parts: (1) the money needed to make the purchase and (2) an available supply of the wanted merchandise.

It is easily seen then that the essential condition is that increases in money wages must not exceed increases in output per worker. If it does, prices will steadily increase along with money wages. In other words, we must not prolong nor foster a scarce economy. When we speak of output per worker, we approach sacred ground, sacred that is, to many labor leaders and anyone who wishes to befuddle the actual working man. We must think not in terms of "speed-up" or "slave-driving" or other equally obnoxious practices. The term "increased output per worker" is often deliberately twisted in meaning so that it is frequently misunderstood. Management has become gun-shy of this basic economic law because of the psychological reaction it engenders among working men.

By this term we mean increased output per worker that comes from the use of more and more mechanical power, more power-driven tools, improved tools, methods, materials and facilities. Of course electricity plays an enormous role in this field. We mean more output per worker and yet at the same time less physical labor. We mean too that artificial production restrictions, feather bedding and plain loafing on the job must be discontinued if we are to live in economic moral decency.

Many interesting stories are told about the early use of improved tools. About 150 years ago spinning machines were introduced in England and the workers destroyed the machines. They feared such mechanical devices would destroy their chances to earn a living. Here again was a tremendous educational problem. Even today we occasionally hear similar stories and fears, yet everyone acknowledges that mass production by machine tools and power is the very keystone of our civilization.

In one instance, that of mechanical refrigeration, even as early as 1930 there were twice as many people employed manufacturing and servicing the machines as in making ice. Why? Because our national living standards were being raised by the introduction and use of this new device and people liked it.

While the average man may not still fear unemployment from technological advances, he still does not fully accept the theory that he must produce more to have more for himself. One reason for this is the basic human failure of believing that which sounds best, rather than facing up to facts. Too many people still believe—as indeed they have been encouraged to believe—that we can have more without producing more. More pay, more security, more benefits of all kinds without regard to whether there is a corresponding increase in production. The painful truth is that, under these conditions,

* Based upon an address before the Pacific Coast Electrical Assn., Coronado, Calif., May 26, 1949. The author is indebted to Frank D. Newbury, consulting economist, Westinghouse Electric Corp., for his statistical material.

we are merely trying to pay ourselves at a much higher rate than our productivity has justified. It just won't work.

When there is an increasing output per worker under these typical American conditions, wages can be increased without increasing prices. As has actually happened over the years of our experience, wages can be increased at a higher rate than prices increase, thus actually and truly increasing the worker's purchasing power. On the other hand, wage increases without corresponding increases in productivity per worker have raised the greatest barrier against stabilization of manufacturing costs.

You may wish to challenge the previous statement that over the years wages have increased at a higher rate than prices. It is a matter of record that, during the past 40 to 50 years, money wages per week have multiplied six times—from $9 for 54½ hours work in 1900 to $54 for 40 hours work in 1948. Over the same period the cost of living index has multiplied three times, largely because of the increase in food prices. *Real* purchasing power, therefore, has doubled in nearly half a century because money wages increased twice as much as the cost of the necessities of living.

Here is an interesting fact which is worth remembering. The *real* purchasing power of the workers increased at about this same rate during the 30 years from 1900 to 1930—before organized labor was such a powerful economic and political influence. It has continued to increase over the past decade in spite of all the difficulties of a world war and subsequent economic adjustments. It has therefore increased under all these very different surface conditions—with strong unions and even without unions, during peace and war—*but only because the output per worker has continued to increase.*

Most Americans know and acknowledge that they live better than the people of any other country. But the general belligerent attitude toward individual productivity in all industries shows that millions of our people either don't know or don't care why this condition exists. Many of our present-day problems in both industry and economics could be solved easily if we could get our people to understand and take interest in this most vital subject.

The challenge is obvious. It is a matter of education, but it must be done. What are you going to do within your own company to see that this great truth of the American free enterprise system is understood and accepted?

But we cannot stop here although we already know the answer to our question. There are a number of collateral questions which must be satisfactorily answered before I can expect you to accept, without important reservations, the conclusion as stated.

Three of these collateral questions are: (1) Who is responsible for our current high prices? (2) How do corporate profits affect worker's purchasing power? (3) Do workers now get a fair share of our national income? To elaborate:

Who is Responsible?

Who is responsible for high prices? During the war years, prices were held down by government controls much more drastically than was considered politically expedient to hold down wages. So of course the worker's real purchasing power was artificially increased. In 1946 price controls were removed after weekly earnings had gone down because of shorter hours and smaller bonus pay. During the past three years prices have risen rapidly and much faster than wage rates. The result has been that during this time the worker's real purchasing power has suffered a reduction from the peak war values of 1944-45.

After decontrol, prices increased more rapidly in a few months to reach levels they would have reached more gradually had war price controls not been in effect. But this behavior of prices has been generally misunderstood. The rapid rise has been blamed on most everything except the true underlying cause—which had been operating in spite of the temporary effects of price control. This real cause is the depreciation of the dollar that has been in progress since 1933, and more rapidly since 1946.

Prices have gone up primarily because the purchasing power of the dollar has gone down. We have an increased supply of dollars which depress the value of the dollar much more than we have been able to obtain by a corresponding increase in the supply of goods. Two world wars and a long depression with resulting deficit financing by government, have put many more dollars into our pockets and bank accounts. We have too many dollars chasing too few goods. As a result our 1948 dollar bought only as much as 42c bought in 1914, or about 60c in 1939. This depreciation has affected the money tag on everything that is measured in dollars—wages, dividends, rents, interest, profits and cost of living.

Remember that in 1914 our total money supply in this country was eleven billion dollars. Today it is ten times that much or 110 billions. In 1939 it was 33 billion dollars. It increased three times in 25 years. Then it increased another three times in about six years.

This decline in purchasing power—rooted in this large increase in dollar supply—acts like a hidden sales tax that nobody escapes. It is a sales tax but not of the usual 2 or 3% variety. It took 40c out of every dollar of 1948 wages, profits, dividends, rents or any other source of income. The only reason we can pay this enormous tax is that incomes—such as wages—have been increased by these same economic forces. High food prices, for example, account for the farmer's high income. Farm income, factory wages and prices are all tied together as links in one economic chain. And no nation has been able to break this chain nor separate their interdependence—not even a powerful totalitarian government such as the USSR.

How do corporate profits affect worker's purchasing power? This is probably the most controversial question related to our general subject. Labor leaders have one answer. Management has a different answer. Labor's answer is that somehow, in devious ways, profits are subtracted from wages and thereby the worker's purchasing power is reduced. High dollar profits are taken to indicate "ability to pay" higher wages with no increase in prices. That was the story for the first round of wage increases in 1946 and has been the constant plea since.

Management's answer is that which I have already given—that increased income must come from increased output per worker through increased use of mechanical power, new tools and methods, more honesty in working attitudes, etc.

Our American workers produce more than workers in any other country. And this is not accidental. They have available more mechanical helpers and better tools than any other class of worker. The American worker produces many times as much as his grandfather, not because he has a stronger back and certainly not because he works longer hours. Electrical and mechanical power has replaced brute strength. Machine tools, jigs and dies have enabled average skilled workers to produce more, and sometimes better, products than their highly-skilled, but hand-working predecessors. Our worker produces twice what his British cousin can produce in the same time. The average American factory worker has seven horsepower of mechanical and electrical energy available to reduce the physical

energy he would have to expend. Our workers produce six times the output per worker in Russia because we have about six times the tools and power per worker. But remember too that this increased availability of power and tools for our workers only comes about because of increased capital investment per worker and one of the most important sources of these investment funds is the profits earned by industry.

Plant Investment Per Worker

Plant investment per worker averages $8,389, plus added amounts for inventory of raw materials, etc. It ranges from $3,759 per worker in textile industries to $21,205 in the telephone systems, $27,375 in the chemical industry and nearly $70,000 in some light and power companies.

So here we find the important links which connect profits to invested capital, to output, to *real* purchasing power. The only source of long-term investment funds are the savings of individuals and retained profits of business. Both of these money sources have their roots in profits from private industry.

Bank loans cannot do the job. While they are at times helpful, they are only a short-term, temporary source of funds. Government can supply funds for investment through taxation but this is not desirable. When the government *creates* new money for investment, as it did during the war, we the people have to pay for it through the hidden sales tax of a rising price level and depreciated money.

Now we come to the last point: whether the worker gets a fair share of our production, i.e., our current national income.

Many people believe that the distribution of our national income is unjust, that too much of it goes to property and too little to workers. There are humanitarian motives behind these feelings, but do they result from facts? From income tax figures issued by the Treasury Department and national income records of the Department of Commerce, we find that it is actually the so-called rich who are getting a smaller and smaller share of the total income, and that a continually larger share of our national income is going for labor.

As an example, suppose we place the dividing line between small and large annual incomes at $5,000 (and this is a debatable figure under present-day conditions). We find that approximately 90% of all wages and salaries are paid to those earning under this figure. That is before federal income taxes. After taxes this lower-income group receives 95% of net national income. Under these conditions we see that large individual salaries can't be too important in our over-all economy.

These same people, i.e. those with total annual income of less than $5,000, receive over 80% of all dividends after payment of income taxes. You may be startled to learn that these same people receive 90% of all rents, after taxes. Landlords are no longer the "bloated plutocrats" of yesteryear, but are actually millions of little people. Perhaps this has natural correlation to the significant changes that have entered our economic lives in the past several decades.

Now let's look at what has happened to the people whose individual annual incomes exceed $25,000. Their share of the total national income has steadily declined since 1917. In that year they received 6.7% of the total income; in 1944, after income taxes, their share had shrunk to 1.3%.

How about the distribution between workers and property? In 1948 about 60% of the total income went to wage and salary employees. About 20% to farmers, professional people and self-employed business men. In other words, 80% of the total national income will be received by workers of various categories. In 1929—another year of full employment—the corresponding figures were 58% and 16%, or a total of 74% against the present 80%.

Property income, including rents, interest on loans and corporate profits (all before taxes) amounted to 26% of total income in 1929—20% in 1948. Therefore we see that the share of income received by workers has increased since 1929.

Corporation profits after taxes, are a smaller share of total income in 1948 than they were in 1929. But by distributing a smaller share of profits to stockholders as dividends, corporations will retain for reinvestment in industry 4% of the national income in 1948, against 3.6% in 1929. What part of corporate profits do workers plan to take as increased wages without injustice to the large army of small stockholders or without injury to industry and themselves? Will they take some or all of the 3.3% of national income that millions of small stockholders received in 1948? Or perhaps some or all of the 4% of total income that corporations will retain for reinvestment in industry—which income makes more jobs, increases ability to produce and thus raises the real earning power of the workers?

These trends in income distribution are not disturbing, in fact they are even encouraging and healthy for the great mass of workers, except for one great danger previously pointed out. If we continue toward the direction of larger shares of income for consumption and smaller shares for reinvestment in industry, we will seriously impair our capital structure and the worker's real purchasing power will decrease.

To maintain full employment as our population and standards of living increase, we must preserve a favorable investment climate to increase our plant capital structure. All such funds must come from profits and savings out of production. If we need a living example, Great Britain has been following this course for more than 30 years. Too large a share of income has gone into consumption channels and too small a share into reinvestment in plant. A great part of their present difficulties are consequences of this policy.

Labor's Stake in the Future

The working man—and we must here consider his collective voice, the labor unions—has a great stake in the future of our nation. By the same token he must share in the responsibility for that future. A full understanding of the part both wages and profits play in our modern industrial structure and a more realistic attitude on the part of labor toward both, would go far to assure our nation's continued progress.

Furthermore, a better understanding by all segments of our country as to the close relationship between productivity, wages, profits and taxes would certainly go a long way to solve some of our problems. Even a simple pledge by government that tax rates will be maintained or reduced, would help to improve our present economic picture.

We must never lose sight of the basic fact that any drive for higher wages without a corresponding increase in production, simply is not honest in the true light of benefit to the worker himself. It has not worked in any other nation in the world. Why do we think it will work for us? A story from Sweden which recently appeared in our public press quoted the Swedish Federation of Labor as follows "Continued improvement in the living standard of the worker in Sweden cannot be achieved by means of increased income alone—but only on the basis of a corresponding increase in production."

So I come back to the answer given you before. The worker's real purchasing power can be increased best by increasing his earning power through a steadily increasing annual investment per worker to produce more with less hours per week and less physical labor. There is no other sure way.

Southern California Edison's new insulator washer embodies best features of existing hot-line insulator washers. Ten-ton truck carries 700 gal. of water. Separate tank truck of 1,500 gal. capacity maintains water supply to washer

LAST WORD IN INSULATOR WASHING

C. W. Sanders
Southern California Edison Co.

THE last word in insulator washing equipment recently has been placed in service by the Southern California Edison Co. This piece of equipment, here illustrated, incorporates the best features of apparatus used in the past by the Edison company and other California utilities for washing insulators on energized lines by means of a high-pressure water stream.

There are three essential elements to any piece of mobile insulator washing equipment: a high-pressure pump, some means of getting a man up within range of the insulators, and a nozzle to direct the stream of water. Edison's new washer differs from others principally in the means of getting the man up in the air within washing range of the insulators. From the accompanying views it will be evident how this was accomplished. Instead of a vertical hydraulic lift platform, or a piece of fire ladder apparatus, the new Edison truck uses an all-aluminum revolving extendable boom or crane. This is controlled by an operator seated on the turntable of the crane. Before him are the necessary controls and instruments. Being seated at the base of the boom and high in the air, he is looking directly up the boom from the most advantageous position possible.

The water gun operator or hoseman rides in a hinged basket at the end of the boom, from which he can safely and conveniently work. The operating crew consists of a third man who drives the truck and looks after the pump and the hydraulic equipment. An important and noteworthy feature of the equipment is the use of interlocked controls by which any one of the three men may stop the boom. If stopped by the man in the basket it requires agreement of all three men to again operate the boom. This is considered a very important safety provision.

The nozzle on the end of the high-pressure hose is the result of development by several utilities. A nozzle for this purpose must be so designed that the stream of water stays in solid form for some considerable distance. The water must not swirl and break up into spray before striking the insulators. A solid stream under high pressure is necessary to wash the insulators effectively. One of the most successful nozzles, and the one Edison uses, is one in which the water passes through a number of parallel small tubes before being forced from the 1/8- 3/16- or 1/4-in. changeable nozzle tip. This eliminates the tendency for the high-pressure water to swirl and break up

into spray. The stream will remain in solid form for a distance of some 15 ft. at a nozzle pressure of 600 psi.

With the boom extended to its maximum length of 65 ft., it is possible to wash insulators on 90-ft. poles. Ability to rotate the boom through 360°, and to elevate it to 85°, makes possible placing the hoseman in almost any conceivable position. When traveling between poles, the boom is lowered sufficiently to clear drops or other obstructions. When it is considered that only one minute is required for a complete cycle of operation of the boom from traveling position to maximum working position and back to traveling position, it is understandable that 30 poles of single-circuit line per hour may be washed. In a 6-hour on-the-job working day, this means that 180 poles may be covered. Such progress means low unit washing costs. It is the reason why so much thought was given to design.

The truck used is a 10-ton White. Besides the high-pressure pump and hydraulic equipment, the truck carries a 700-gal. tank. This is ample to keep the equipment in operation while a 1,500-gal. tank truck makes a trip for more water. With such a long boom, it is necessary to use truck stabilizing jacks. For this purpose, two hydraulic cab-operated jacks were provided.

Some further detail of the equipment will be found in the following specifications and by a study of the accompanying photographs.

Design Data

With an engine speed of 1,000 r.p.m. basis of design is:

1. Rotation — Turntable will rotate through 360°.

2. Elevation — mechanism will elevate the boom from horizontal to 85° above horizontal, and stop and hold the ladder at any intermediate position.

3. Extension — extending mechanism will extend, stop, and hold the boom extension at full length or at any intermediate position. Over-all height from ground to bucket trunnion axis is to be 65 ft.

4. Time—complete cycle of operation is to be considered as elevating from 0° to 85°, extending the boom to full length, rotating from 0° to 175°, retracting, rotating from 175° back to 0°, and lowering the boom to carry. Total time of operation to be one minute. Hoseman is to be in the bucket during the cycle.

5. Factor of safety—factor of safety for the ladder should be at least 3.5, based on the yield point of the material used, with the ladder fully extended in the horizontal position but not at carry.

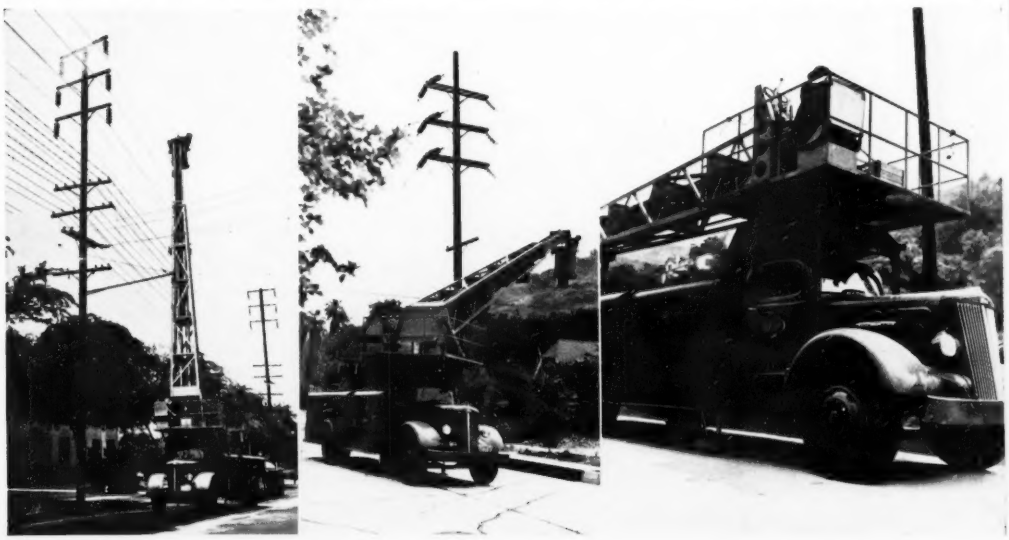
6. Operating—the elevating, extending, and rotating movements are to operate either in unison or singly.

7. Safety controls—automatic means to be provided to stop elevating, extending, and rotating motions at their operating limits without damage to equipment. Hoseman to be provided with a control in the bucket to stop all motion.

8. Nozzle—the hose nozzle shall be made of a hard bronze, machined outside, and polished inside. The removable orifice shall be of polished cemented tungsten carbide (wire drawing die). Orifice diameter .250 in. The nozzle shall be provided with straightening device to take the turbulence out of the water as it approaches the orifice. The nozzle shall discharge a compact stream of water for a distance of 15 ft. without breaking into spray, at pressures of 500 to 600 psi. Diameter of the water stream shall not exceed 2 in., 15 ft. from nozzle.

9. Water pump — water pump furnished is a Food Machinery Corp. "Bean" Triplex, rated to deliver 50 gpm. at 800-psi. continuous operation, and 40 gpm. at 1,000 psi. intermittent.

Washer operating on a busy street may be seen at left. Boom is shown partly extended to reach 69-kva. circuits on 70-ft. pole. Only one minute is required for complete cycle of raising, lowering and revolving boom. Rated washing speed is 30 poles of single circuit per hour. Versatility of washer is shown in center view. Here the boom with its hoseman's basket is extended out under 69-kv. circuit on suspension insulators. Dead-ends do not require washing. Boom operator rides at base of boom as shown at right. Before him are necessary hydraulic controls and instruments. Controls are provided so that hoseman, boom operator or truck driver may stop boom at any time. If hoseman stops boom, interlocking controls require agreement between two of the three men to again operate the boom. One of two cab-operated hydraulic jacks for stabilizing truck may be seen mid-point



Electrical West—Vol. 103, No. 1

PREVENTIVE MAINTENANCE—I

H. Burns Colby

Maintenance Engineer
Public Service Co. of Colorado, Denver

UTILITY engineers recognize the reliability built into present-day electric system equipment. This has been reflected in budgets of expenditures for maintenance. Despite the rapid increases in load and output since the war, maintenance cost stays in apparently normal line with growth of the industry. Due to the great variety of electrical equipment used in the utility generating and distributing plant it is obviously impractical to cover the subject of preventive maintenance in anything but a general manner in thi series of four articles. Therefore, only an outline or suggestion of preventive maintenance procedure as applied to the utility plant will be attempted.

For too many years maintenance has been looked upon as one of life's necessary evils. While it was recognized that failures were bound to occur unless certain things were done in the normal course of equipment operations, there has always been a tendency to perform these operations with a hope and a prayer. The electric utilities' bill for maintenance amounted to approximately $306,000,000 in 1948 and will amount to approximately $314,000,000 in 1949. The mountain region alone, consisting of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada, will spend approximately $89,600,000 on electrical maintenance and replacement. This gives a general idea of the size of the job. Preventive maintenance properly and persistently applied will effect a considerable saving. A well-maintained system will result in better service, lower maintenance costs and fewer emergency repairs.

A brief study of a summary of some of the equipment failures as listed in the EEI Electrical Equipment report No. 34 on apparatus troubles and equipment failures from Feb. 15, 1948 to Aug. 15, 1948, indicates that some of these costly failures might have been avoided by preventive maintenance and testing. This report shows that 23 oil circuit breakers failed of which 17 resulted in an oil fire. These failures were caused by arc restriking, failure to interrupt arc, bushing failures, water and carbon in oil, and binding of mechanical parts. There were eight generator stator failures resulting in fires that were caused by coil vibration, insulation failures, carbon dust in insulation layers, insulation dry and brittle, lightning and carona. Four generator rotor failures were caused by plastic deformation of connections and insulation failures. Moisture and lightning caused 13 lightning arresters and 20 induction and step regulators to fail. Ten transformers over 500-kva. capacity failed due to windings, seven due to tap changer troubles and four due to bushings. Five of these transformer failures resulted in oil fires. There were also a number of instrument transformer failures. Six synchronous condensers and many large motors failed due to various causes.

Three Maintenance Methods

There are three basic methods of maintenance now employed to maintain and replace facilities:

1. Repairs and replacements after breakdown.
2. Periodic basis of inspection, repairs and replacements.
3. Protective and corrective maintenance on a preventive basis.

The "after breakdown" method is just what its name signifies. Little is done before failure and the consequent shutdown. Such failures mean long outages and high repair bills. Life of the facilities is about that used by valuation experts. Replacements and maintenance cost less in parts and man-hours than under periodic maintenance, but give relatively poor economy, service and life. The condition and appearance of the property is generally poor.

Periodic maintenance is the most expensive of the three in man-hours, material and supervision. Too many parts are replaced or repaired before necessary. This method requires that the equipment be removed from service at regular intervals and torn down, carefully inspected and everything repaired whether needed or not. Economy of operation is improved. The condition and appearance of equipment and property is generally good.

Preventive maintenance consists of persistently making slight repairs and adjustments to the few critical items of a structure or mechanism in a scheduled and organized manner. This makes special inspection and heavy repairs less necessary. Small repairs, proper lubrication, cleaning of contacts, and making adjustments often enough to a few critical parts will delay complete periodic overhauls. Experience shows that preventive maintenance reduces breakdowns, outages are shortened, and necessity for periodic overhaul is lessened. Periods between general overhauls are lengthened. This method uses the least amount of material and the fewest man-hours are required. The useful life of equipment is extended. Condition and appearance of the property are always good under this plan.

Preventive Maintenance

It is believed that the most practical plan is a continuous preventive maintenance program, combined with periodic maintenance at rather long intervals. Preventive maintenance never ends. It must be carried out on machines turning at high speeds. Other equipment may be carrying extremely heavy loads. Some equipment may be subjected to high temperatures; some must with-tand erosion, corrosion or low temperatures. Organic and inorganic acids and new water is formed in insulating and lubricating oils by oxidation. Electrolysis and soil bacteria attacks many things. The elements attack paint, metals, wood, concrete and even insulators.

All of these things must be noted and decisions made as to the best way to meet the conditions. This means making up prearranged schedules to obtain the best use of available men, favorable weather, and to coincide with periods in which outages of the equipment can best be tolerated. Work should be scheduled out over the entire year, so as to

make more efficient use of maintenance men, and create better working morale.

Selection of Men

The selection and training of preventive maintenance men is very important. Men should be picked who consider it more important to keep the machines running than to make reports, inspections, periodic overhauls and heavy repairs. Consideration should be given to men who are fast, safe workers who can do an 85% job quickly, rather than men who will do a 100% job slowly or in an unsafe manner. Maintenance men should have some training as operators as well as mechanics.

These mechanics who have been trained and put to work should be made responsible for the facilities to which they regularly apply preventive maintenance. The conditions of these facilities should be the records of their work. Few paper records should be required of these men. If the preventive maintenance mechanic believes certain heavy repairs that he cannot do are required, the superintendent should investigate and approve, or not. The mechanic should then supervise any heavy work to be done by others and be held responsible for results and cost of these repairs.

Organizing Work

In applying preventive maintenance, it is necessary to organize, schedule, and direct all work. To organize is to determine what is to be done, and how it is to be done, including tools and means of transportation. In scheduling preventive maintenance, the elements of place and time are taken into account. Forms are set up to show "what, where, when, how and who." Even "why" can be included.

Keeping records of inspections, repairs, and tests is an important part of preventive maintenance. It provides a means of running down chronic troubles and finding the causes. It provides a basis for estimating what spare parts should be kept on hand and how often repairs will be necessary.

It takes time to realize all the benefits of preventive maintenance. It is impossible to get results by securing a set of preventive maintenance schedules and merely ordering the repair foreman to apply them. As a person learning to walk, progress is made a step at a time. It is not necessary to "gold plate" an electric power system to initiate preventive maintenance. In fact, better results are obtained with less effort and lower expense if such a maintenance program is started with the property "as found."

Schedules and Records

In establishing a balanced preventive maintenance program, two features are essential. It is important to have complete and adequate history records of the various types of equipment in order to determine trouble expectancies. This furnishes a background upon which to apply judgment, inspections and direct tests, and establish a program.

The second feature involves the direction of preventive maintenance on a selective basis. This is determined by trouble expectancies, age of the equipment and importance of the equipment to maintaining service. Therefore, in the interest of economy and effective work, schedules and records are necessary.

Each piece of equipment should be inspected at specified intervals. To carry out such a program, it is necessary to follow an effective but simple method of scheduling the work and keeping records of inspections, repairs, and tests. In setting up schedules reference should be made to manufacturers' recommendations. There are also several manufacturers publications that are useful. *How To Maintain Electric Equipment*, a publication of the General Electric Co. No. GET-1125; the Westinghouse book called *Maintenance Hints*, publication No. HB-6001C are two of these. Allis-Chalmers and other manufacturers have available information on how to maintain various equipment. The National Carbon Co. has a very practical book on subjects relating to brushes, commutation and the like.

A sample inspection form might be made out, as in the table below.

The reference column numbers are intended to indicate paragraphs that give pertinent instructions on inspection and maintenance. It is important that a card record form be prepared which may be used for routine inspection records for motors and controlling equipment. Other inspection schedules and forms may be set up to include all electrical equipment.

1.00 Motors and Generators

Item of Inspection	Inspection Interval	Reference
Surroundings	W	1.01
Foundation and base	M—A	1.02
Frame	A	1.03
Laminations and pole pieces	A	1.04
Rotors, armatures, air gap	A	1.05
Fans, filters and ducts	M—A	1.06
Windings	M—A	1.07
Wedges, banding and lashing	A	1.08
Brushes, commutators and rings	DO—M—A	1.09
Shaft and bearings	A	1.10
Gears, pulleys and other drives	A	1.11
Air coolers	DO—A	1.12
Fire protective equipment	M—SA	1.13
Temperature indicators and relays	A	1.14
Water and oil flow gages	A	1.15

DO—Daily inspection by operators. W—Weekly inspection. M—Monthly inspection. SA—Semi-annual inspection. A—Annual inspection.

Paragraph No. 1.09, for example, could be divided into three parts, thus:

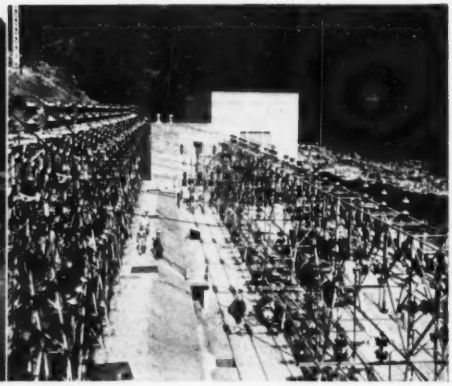
Daily inspection—Check commutator and collector ring operation. Wipe commutator or rings with a canvas pad if necessary. Replace short brushes. Check brush vibration. Maintain hourly visual inspection.

Monthly inspection—Remove all brushes from holders and clean by wiping. Remove all carbon and metallic dust from holders and rigging. Remove dust and oil from commutator and rings. Check brush fit in holders for sufficient clearance and check brush spring tension.

Annual inspection—Tighten bolts, screws and connections. Reset brush holders if not properly spaced. Check brush neutral position if parts were loose. Turn down, stone, or polish commutator or rings if rough, threaded or eccentric. Undercut mica if high, clean and check per monthly inspection.

Important—if the commutator or rings have a good polish, the surface should not be disturbed.

The next installment, Part II, will take up maintenance testing; test equipment and procedure; bushing rating data, and bushing power factor curves.



Old Colgate power house (left) built in 1899, replete in historic interest, has passed into oblivion. It was dismantled and in its place now stands the modern new Colgate (right). A single unit in the new plant now turns out nearly double the power of the seven units in the old plant. PG and E put this new plant on the line on June 16

Historic Colgate Plant is Rebuilt

Single 30,000-kva. unit replaces seven old units to gain 11,000 kw.

Colgate power plant, named for Romulus R. Colgate of soap fame, with its Stanley inductor generators that made history in 1899, is no more. The old plant was demolished and in its place now stands a modern hydroelectric plant and switchyard placed in operation June 16. The same flow of water as before under 120-ft.-higher head, gives the new plant a capacity of 30,000 kva. from a single unit as compared with 15,575 kva. from seven units in the old plant, an increase of 11,000 kw., or nearly double the capacity of the original plant.

Colgate was rebuilt by the Pacific Gas and Electric Co. at a cost of $3,325,000 as part of that utility's program to bring in nearly 2,000,000 hp. of new generation by 1951. The first Colgate power house located on the north fork of the Yube River 35 miles northeast of Marysville, Calif., was placed in operation on Sept. 5, 1899, by the Yube Electric Power Co. The company was headed by John Martin, Eugene de Sable and Romulus R. Colgate, pioneers in California's early hydroelectric history. The plant was the first to serve the San Francisco Bay area with hydroelectric power. It was antedated only by the Folsom plant, oldest on the present PG and E system.

A line was first built to Sacramento, a distance of 70 miles, and in 1901 the Bay Counties Power Co. completed a 60,000-volt line to Oakland, a distance of 142 miles. At the time it was one of the earliest successful high-voltage, long-distance transmission lines. One of the accompanying photographs shows the third generation of these old original Bay Counties lines.

Third generation of the two pioneer 60,000-volt Bay Counties transmission lines from Colgate power house transmit hydroelectric power from the mountains to the valleys as they did in 1899

On Sept. 13, 1946, the old power house was partially destroyed by fire and on Oct. 6, 1948, the equipment was dismantled, the building torn down and construction of a modern concrete power house begun. The old plant had seven units. Three were 1,250-hp., Risdon, single - overhung, twin impulse water wheels each driving a 900-kw. 2,300-volt, Stanley inductor generator; two more 3,000-hp. Risdon wheels of the same type each driving a 2,000-kw. similar Stanley generator. There was one 3,000-hp. Doble, single-overhung impulse wheel driving a 2,000-kw. Stanley inductor, and one 7,500-hp. double-overhung Doble wheel driving a 6,875-kva. revolving field Westinghouse generator.

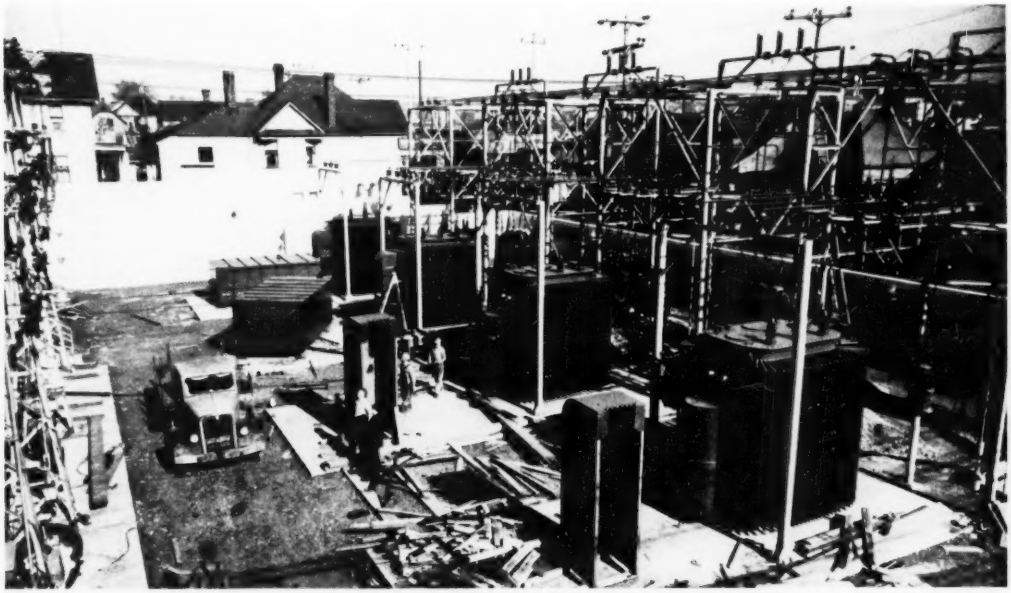
A single Pelton turbine in the new plant drives a 30,000-kva. Westinghouse generator. One 66-in. to 96-in. penstock extends 1,630 ft. down the mountain side from tunnel portal to turbine to provide a static head of 820 ft. From the diversion dam eight miles upstream, waters of the Yuba are carried through 4.6 miles of tunnel to the

Fifty years ago, 32 horses were required to pull a special wagon with solid wooden wheels over mountain roads to transport half of a stator to the original Colgate plant.

How long it took was not recorded. Today, modern transportation moved the rotor for the new Colgate plant from Marysville to the site, 36½ miles, in seven hours

penstock head. The new Colgate power house with its modern concrete building and high-efficiency primemover and generator now stands as a monument of fifty years of progress in the hydroelectric art in California.

Bechtel Corp. was contractor for construction of the new plant. Consolidated Western Steel Co. fabricated and installed the penstock. Work was carried out under supervision of O. W. Peterson, engineer of general construction for PG and E, with H. W. Haberkorn, engineer of hydroelectric construction, in immediate charge.



Seattle City Light's First Hill substation is part of a large program of that utility. Unique feature is the combining of four 6,000-kva. General Electric package units into a 24,000-kva. major distributing substation. Four 26-kv. overhead circuits supply a high-tension ring bus. 4.3-kv. feeder getaway is underground. Besides a-c distribution, the station has three 1,500-kw. ignitron rectifiers supplying transit load. Switchgear for the d-c consists of I-T-E draw-out metal clad air breakers rated 2,000 amp., 750 volts d-c. There is a slate control board with non-enclosed bus running to the enclosed switchgear. Slate panels are mounted on wood sills on a floor of double-layer masonite to prevent any possibility of cathode breakdown. Anode and cathode breakers are located on a lower floor. The new station will be supervisory controlled from a new downtown dispatching center being built by Seattle City Light

FCC ASSIGNS NEW FREQUENCIES

After seven months of wrestling with the problem of spreading the limited available frequency space among the fast-growing mobile radio services, the Federal Communications Commission on May 3 came up with its new rules—some 300 pages of them—governing these services, effective July 1.* The commission turned down the plea of power utilities to be classified as a "public safety" service for purposes of frequency allocations; thus they remain a sub-group in the commission's Industrial Radio Services category. However, in view of the intense competition for frequencies among a myriad of services, utilities did not do too badly when the channels were passed around.

Table I is the final box score of frequencies available for assignment to power utilities, which include electric, gas, water and steam utilities.

In addition, 20 channels in the 450-460-mc. range (100-kc. band width) were made available to power utilities on a shared basis with other industrial services, "under terms of a development grant only." In other words, the assignment is firm, but use of these channels will be on an experimental basis. The other industrial services with which utilities are grouped in the commission classification are petroleum, forest products, motion picture, relay press, special industrial (construction, fabrication, manufacturing, etc.) and low-power industrial.

The 80 channels in the 72-76-mc. band will be shared by all services in the entire mobile radio field, now grouped by FCC into five categories —public safety, industrial, domestic public, land transportation and maritime mobile. Their use will be on a "no interference with television" basis.

A quick picture of what the utilities have had, what the FCC proposed to assign them, and what they stated as their requirements, can be seen in accompanying Table II presented by the National Committee for Utilities Radio during oral argument last October on the commission's proposed plan of allocation issued in May 1948.

In line with the NCUR's argument that utilities could not feasibly use frequencies in the 25-30-mc. band with present equipment, and urging assignment to them of all possible channels in the 30-50-mc. range, the commission knocked out the proposed lower-frequency allocation; upped it in the 44-50-mc. band. In effect this was a switch under which petroleum services were given more of the 25-30-mc. channels (which they can use practicably) than proposed, and less 44-50-mc.

In that connection, the 22 frequencies assigned utilities exclusively in the 44-50-mc. band is bigger than it looks when comparing the NCUR's chart with the new allocations. Both FCC's proposal and the NCUR requirement figures were based on an assumed band width of 20 kc. whereas the actual assignment provides for 40-kc. spacing. The commission warned, however, that as the spectrum becomes more crowded, narrower spacing will have to be required.

With reference to NCUR's complaint "common to all other services" that an inadequate number of frequencies was proposed for utilities in the 152-162-mc. band, the commission noted that at present utilities share eight frequencies in that range and that the proposal on which argument was heard would have made six frequencies available on an exclusive basis and 19 to be shared with others in the industrial group. "The sub-allocation, as adopted herein, increases the six exclusive frequencies to nine and eliminates the sharing rights. A study of the plan submitted by the NCUR indicates that this sub-allocation, together with the frequencies sub-allocated exclusively to the utility group in other bands, should prove adequate to make the plan workable and effective."

No provision was made for mobile relay systems, a service strongly urged by Rural Electrification Administration cooperatives. On the basis of the record, the commission was "unable to determine the circumstances under which such systems should be authorized if at all . . . Since additional facts are needed before an adequate determination can be made, the commission will institute further proceedings in the matter in the near future."

Table I

Band	Channels Exclusive	Channels Shared
1.6-6.0 mc.	0	2
25-30 mc.	0	1
30-40 mc. } 40 kc. band width	11	6
42-44 mc. } 40 kc. band width	0	1
44-50 mc. } 40 kc. band width	22	0
72-76 mc.	0	80
152-162 mc. 60 kc. band width	9	1
Total	42	92

Table II

Channel Allocations and Requirements

Band	Allocations: Existing Excl.	Existing Shared	FCC Proposal Excl.	FCC Proposal Shared	NCUR Requirements Excl.	NCUR Requirements Shared
1-5 mc.	2	2	0	7	0	6
25-30 mc.*	0	0	6½	2½	0	0
30-40 mc.	0	11	11	9** }	36	12
42-44 mc.	0	0	0	2** }		
44-50 mc.	0	0	19½	18½		
72-76 mc.	0	6	0	18	0	18
152-162 mc.	0	6	6	11***	20	16
Total	2	25	43	68	56	52

* These channels assumed to be 40-kc. wide.
** Omitting four channels restricted to Dispatch Service, but including two channels restricted to Low Power.
*** Omitting eight channels restricted to Dispatch Service.

*Digest of new FCC rules prepared by L. E. Ludekens, Southern California Edison Co., for presentation at the Coronado Convention of the Pacific Coast Electrical Assn. May 25-27, 1949.

Labor Pains at District 6 NECA Meet

When Hayden lowered the boom

SOME mighty plain talk on the touchy subjects facing electrical contractors came out at the District 6 meeting of the National Electrical Contractors Assn. held at Hotel Leamington, Oakland, May 22 to 24. Attendance was disappointingly small considering the importance of the problems and the status of some of the participants. Paul Geary, executive vice-president, NECA, Washington, D. C., came to hear and did hear first hand the challenging complaints and the realistic problems facing Western electrical contractors. The Council on Industrial Relations for the Electrical Contracting Industry was taken apart; failure of the International Brotherhood of Electrical Workers to live up to its promises in line construction, was another issue that overshadowed the full program covering sales of contractors' services, functions of NECA, the National Electrical Code, and chapter activities.

At the end of the conference, stinging from the frank criticism of NECA, Geary dropped the "party line" and talked man to man. He said the discussion had been good for him, he had learned the views of the members from their own lips and it would influence his handling of national affairs. He said it was the contractors' organization and that they could do with it what they pleased. "If you don't like what I do, you can get rid of me," he declared, "but don't throw away your association. It is bigger than I am. And you need it."

In the absence of J. B. Shamel, district vice-president who had just resigned, E. L. Buttner, labor relations committeeman for the district, presided. Leroy Bennett, director of activities, Northern California Electrical Bureau, presented the contractors "A Challenge to Sell." Bennett pointed out that contractor-dealers had passed up the appliance business in the past yet the servicing of appliances and the provision of wiring for satisfactory use of appliances presented contractors with a sales opportunity which they should not overlook. With such appliances as freezers, dryers, television sets, all requiring heavier wattages and all needing adequate wiring, he pleaded with contractors not to retard the sale of appliances but to realize the need to increase wiring in residences and teach their salesmen and wiremen to so convince the people for whom they were wiring homes. Profit opportunities for contractors, he said, were to be found in the built-in ranges and ovens, in auxiliary electric heating, in fans and ventilators, and in the lighting fixture business. The chain stores, he said, were doing well with the fixture business and by-passing contractors since the installation was being done by the man who bought the fixture. "You need the income that comes with this line. You are also equipped to render service on appliances. Appliances are tied in with good service. There is also an opportunity for many contractors to be dealers." Many of the points brought out in Bennett's paper will be published later.

J. D. O'Connor, Sacramento contractor, was next asked to report on bills before the California legislature affecting contractors. He reviewed those of the 5,000 bills before the legislature which affect construction in some phase or other and particularly electrical contractors. The committee is watching this legislation together with the builders' exchange.

It was after this that Paul Hayden, manager, Spokane Chapter and of the Line Constructors' Chapter of the Northwest, lowered the boom. An early agreement had been reached with the unions, said Hayden, because line contractors needed to take their key men to any job in the area. The agreement called for a laborer's scale the same as that in the area. For the high linemen's scale the union promised to furnish them men. Now "no matter what price you pay for the men, you don't get them." He also said that it was thought a high scale would eliminate subsistence pay because a contractor would never know what it would be. Then when linemen were given a good scale, truck drivers demanded the same scale. Contractors trying to help the IBEW save this work have gone along in every respect that they can. But the picture is changing and more general contractors are going after line contracts. The AGC has building trade agreements and they use other laborers for work for which electrical contractors have to use IBEW at higher scale. They complain that the IBEW was tickled to get a small portion of this work from the generals and turned their backs on the other. "A general can pick up all the farmers he wants for labor work without interference from the business agent, but when an electrical contractor tries it, the shop stewards police it all over the place." Hayden said that the business agent never goes after the general contractor who may only pay into the pension fund for perhaps six men on a contract. If this condition prevails, the IBEW is going to lose all the line work because the other trades will do all of it except string the wire, and they may even do that. Contractors say to the chapter that they are better off under AGC and can even run their jobs open shop. When the complaints are made to the IBEW business agents, they say their hands are tied and complain that the political situation in their own union prevents any action. He urged that the California-Nevada Chapter be organized quickly to help on the problem. Warren Penn, manager, Southern California Chapter, supported Hayden's contentions and said that, unless IBEW policy changes, it will put con-

tractors out of this business because they are not in a competitive position with outside contractors.

Considerable discussion on this problem ensued. Buttner declared that economics would be the only thing to straighten it out, that the IBEW cannot handle its linemen itself. W. J. Varley, manager, San Francisco Chapter, declared that, when economics destroys the union, it will destroy contractors too, and proposed a conference immediately with Tracy, Broach and Milne of IBEW headquarters to straighten this out from the top down. "If this starts with line work it will come inside and affect it too," said Varley. Paul Geary, declaring this had been an education to him, said he was willing and anxious to do something about it and urged a conference immediately to map out a course of procedure.

Competition vs. "Gains"

Skipping the first two speakers on the afternoon program for the moment, Oscar Harbak, IBEW vice-president for District 9, spoke on the afternoon session and chiefly about the transmission line, steam plant and hydro plant problem. He recognized that iron workers were performing line work in Arizona and Nevada and that the situation was detrimental to the union, as one skilled man to 100 laborers were being used, and said the IBEW did not propose to let this work get away from it. He assured contractors he wanted to put them in a position to compete; however, the union finds it hard to give up "gains" which it has been working for 58 years to achieve. Penn pointed out that only a wage scale covers the entire works, leaving out the fringes, and recognition of exactly what jurisdiction the IBEW claims, would meet the situation. There was also raised the question of whether the IBEW had men qualified to run special equipment such as cranes, tractors, bulldozers, etc., and Harbak offered to supply qualified men to handle such equipment.

Concluding, Harbak reviewed the history of agreements, saying they were only ten years old and that agreements originally drawn for knob and tube work did not fit steam plant design and that the whole industry needed to change its ways and views.

The afternoon session began with a talk from R. J. Lazarus, Northern California manager, Pacific Coast Electrical Assn., who had attended the National Fire Protection Assn. meetings in San Francisco the week previously. He discussed the changes and the changes in procedure in writing the National Electrical Code, urging concerted effort to adopt the code and to assist in getting county inspection. Peter Montgomery, San Diego Chapter manager, said that San Diego County had approved an ordinance on May 9.

Archie Mooney, chief of the Division of Apprenticeship Standards for California, declared the apprenticeship program to be industrial democracy in action. Joint committees of labor and management set up the standards and procedure. Problems facing both labor and management in the apprenticeship program of the future he named as follows: (1) Unemployment—if journeymen are idle, apprentices will be idle too. A priority question has to be settled whether apprentices should be re-employed first or not. (2) Ratios—whether they should be one-to-four or one-to-five. (3) The veterans' wage bracket, which at present makes him think he is a journeyman because he is getting journeyman's wages under veteran benefits. (4) Too much credit for previous experience, without having completed the necessary training. (5) Completion dates or times. (6) How to increase the efficiency of journeymen since the trade is progressing so rapidly journeymen are not qualified to handle new products and techniques. (7) Whether or not full time wages should be paid during training since apprentices turn out less work. (8) Transferred union apprenticeships causing claims for higher ratings than required. (9) Trade tests for journeymen. (10) Term of apprenticeship—should it be shortened? (11) Replacement of journeymen—could it be determined with entrance dates? (12) Drop-outs—for every 1,000 needed, since 25% drop out during the 4-year training period, 1,330 apprentices are needed. Mooney then showed figures to indicate that there was a need for 4½ times more apprentices in training than are now taking the training. (13) The rotation of apprentices among shops. (14) Specialization versus premium pay. (15) Induction of apprentices. (16) The need for greater employer participation.

The Monday session was a closed one for members only and was opened with a talk from Ed Wismer of Wismer & Becker, electrical contractors and engineers of Sacramento, in the place of Clyde Bentley originally announced. Wismer reviewed interesting experiences in engineering for REAs. He cited examples of REAs whose lines had been built too light to carry the traffic, and the need to study the whole system and work out a plan to bolster it. One example he cited was of 200 miles of line which started with a voltage of 110 and only delivered 60 volts at the end of the line. He went into considerable detail as to the problems involved, and the long and tedious negotiations with Washington to get approvals for the plans and then the final inspection after the contractor has completed the work.

E. R. Cornish, director, Pacific Coast Office, NECA, explained the new office as a base of operations for NECA where materials and forms, etc., were available and the headquarters for a Pacific Coast edition of *Qualified Contractor*. His work also covered chapter contacts. He announced changes in the Seattle Chapter to make it a Puget Sound Chapter with John Majerus, his assistant, taking over as chapter manager until a new manager is appointed. Other new chapter managers within the period since the last conference are Larry Rogers, Portland; Pete Montgomery, San Diego; Noyes Alexander, Fresno, and Ernest Kramm at Northern California Chapter. Cornish has worked out a chapter manual available to those who want it. He then spoke on labor relations and some of the stumbling blocks in providing better relationships. He also stressed the need for more work on educational and research services on the line constructors' section and went into some of the problems of relinquishment of jurisdiction by the chapters in order to get area-wide agreements.

Council Limb from Limb

Then came the discussion on the Council of Industrial Relations. Buttner, who had attended the last session, recited some of his experiences and views. He discussed first the change in economic conditions with unemployment increasing, but said that union memberships did not see this, and were still putting pressure on business agents whom they elected to get them higher wages, and did not recognize they were pricing themselves out of the market. He said business sets a ceiling on what a building will cost, and determines then whether the work is to be done or not. Industries who need more space cannot pay for higher-cost space and operate at a profit and therefore do not expand. Contractors understand this, he said, but until the rank and file of the union is sold on it, pressure will continue to be put on the business agents. He said it was evident after the meetings with Milne last April that a general wage scale of $2.50 an hour had been set as the goal.

Buttner then told why it was best not to refer anything to the council. He discussed the impracticability of regional councils and urged settlements at the local level or at the regional office level. Of the 22 cases appearing

before the council at its last meeting, in all 22 the decisions gave the unions almost what they wanted. When questioned he declared that the vote of the council must be unanimous and that compromises must be made but that it was usually the contractors who made the compromise. However, vacations with pay and paid holidays had all been denied and election day, although recognized as a holiday, would be substituted for one of the others. In some cases double time was asked for overtime but had been reduced to time-and-a-half and he said that the raises given were smaller than they would have been if settled at local levels. Buttner suggested that a panel system should be used so that there would be more arbiters to draw from and that members affected by some local case would not sit on that council's session at all. Each case, he said, was supposed to be decided on its own merits.

Geary told the origin of the council and why L. K. Comstock had originated it in 1920. Prior to this there had been no arbitration and therefore many strikes. There was no legal requirement to arbitrate, but the industry was so demoralized during strikes (causing self-employed mechanics among union members to get into contracting) that both sides agreed it would be good to avoid the annual strike and lock-out. The first enforcement of contracts was always left to the international president. Now, if the council is written into an agreement, the union can be required to take a case to the council, and at least the contractors are represented there. He claimed that while the IBEW was there to get what its locals wanted, the decisions were tempered by better judgment.

Nothing would please the members of the council more, said Geary, than not to have any cases. He urged that, when a dispute is pending, the chapter call the field representative and that all efforts to negotiate it at the local level be carried through. He also urged that negotiations be carried on continuously, meetings being held with the union throughout the year, taking up complaints and carrying on educational work. The worst obstacle to labor peace, he said, was the attitude still prevalent among the trades that new building was the only work to be considered, whereas new building is only a small part. Most of the work is in fields outside of new construction and it is very foolish of the unions to throw out work opportunities in these other fields. He also urged continuous surveys of work being done by IBEW employers and by others and of business conditions.

The afternoon session resumed the discussion of the council and its actions in a vigorous way. Teo Rosenberg, former member of the council, presided and defended it. A resolution was passed first to make a presentation to A. L. Stone from the Sixth District. Stone had previously been vice-president of the district.

Delegates from the San Diego Chapter advocated a Western arbitration tribunal instead of the council and also that chapter managers, who would not have the pressure on them that a contractor has, sit on the tribunal rather than contractors. They also asked that the decisions made by the council, if it was retained, be made in a statement as to the reasoning back of the decision. It was cited that of the 22 cases, raises had been granted in each case averaging 15c per case. No reasoning for the decisions has been published. Stolper of Burbank recommended that the council should also have two men on the labor side who are not members of the union and two contractors who are not union contractors. On a motion from T. V. Heinz of San Diego, a committee was to be set up to study the situation for the Western council and report at the September meeting for action.

Reports then were heard of the various chapters and their recent negotiations. Rogers of Portland reported on the recent passage of a state licensing law and also an increase of the license in Portland to $150. Welch of the Sacramento Chapter reported on the increase to the Bay area scale of $250, April 30, and complained that state licensing was not working out well since many journeymen held state contractor's licenses and were selling these to industrials, real estate firms, wholesalers, etc. Paul Hayden invited the next meeting to be held in October in Spokane. Alexander of Fresno said that Bakersfield was being used as a new guinea pig to get vacations with pay, hospitalization, and many other fringes. He also cited the need for uniform termination dates for agreements and the difficulties in mixed locals.

Majerus, the new Seattle Chapter manager temporarily, spoke of field work to enlarge the scope to a Puget Sound Chapter and to bring in the many members who had refused to have anything to do with the old Seattle Chapter. He also said that the union had asked for a review and possibly elimination of the escalator clause in the Seattle contract which had held wage increases to the cost of living index. Kramm, the new manager of the Northern California Chapter, told of negotiations in four of the branches and in particular of the Salinas situation where, because of a big steam plant being constructed, a number of additional angles were thrown in, such as traveling time, subsistence, etc. Warren Penn, manager, Southern California Chapter, spoke of the home show in which the chapter is one of the largest stockholders. He told of the 16 requests made by the union and of the questionnaire put out to all the contractors authorizing the chapter to negotiate for them and the decision of the council which had reduced the union's demands in almost every respect.

Penn announced that the Houston Chapter had nominated for president of NECA, E. J. Vanderlinde of Rochester, N. Y., and suggested seconding motions from other chapters in District 6.

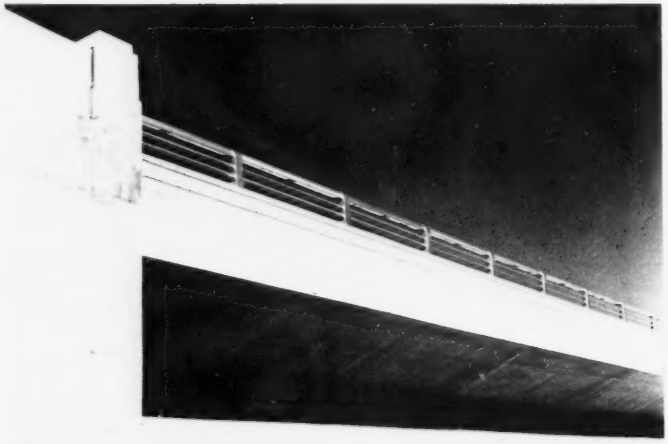
It also was announced that Vice-president Shamel had resigned and the executive committee meeting in Colorado Springs in June would appoint a new vice-president in his place. It was recommended by Chamblin and voted that Buttner be asked to complete the term of Shamel.

Paul Geary, who previously had given a prepared outline of the activities and the functions of NECA, was asked numerous questions at the close. Among them was whether something could be done on labor-only contracts; what was being done for uniform collection of pension funds from all contractors; what the labor relations director of NECA was supposed to do. It was then that he let down his hair and talked plainly, as he closed with the thought that at such conferences one ought to hear more about what contractors had to offer to the public, since they really have something to sell, and that they should use the work of the research committee as sound sales arguments to get more work for contractors.

More Changes

Cecil Searle has resigned both as president of the Northern California Chapter, NECA, and as the chairman of the Santa Cruz branch. William Bassett, Conrad Electric Co., vice-president of the chapter, took over temporarily as head of the organization until the board of directors could meet June 24. Lovell Johnson, Johnson Electric Co., Santa Cruz, was named branch chairman at a special meeting June 13, and Al Young was elected to succeed Johnson as vice-chairman. Searle had been a partner in the Santa Cruz electrical company which discontinued its electrical contracting business in favor of neon sign work. Searle has now formed the Cecil Searle Electrical Co. in Santa Cruz.

Fluorescent Roadway Lighting



SOMETHING distinctly new in roadway illumination is to be found in the recently completed fluorescent roadway lighting installation made on Shasta Dam. Railings on top the dam were made to serve the dual purpose of providing protection and adequately lighting the roadway without sacrificing beauty of line. The accompanying night view shows how effectively the lighting objective was achieved.

On top of Shasta Dam is a 30-ft. roadway with downstream sidewalk of 5 ft. 9½ in., and upstream walk 2 ft. wide, making handrails 38 ft. 3½ in. apart. Upstream handrail has 2,860 lineal ft.; downstream, 2,790 ft. Cast aluminum posts divide the all-aluminum railing into 10-ft. 9-in. sections. One 96-in. slimline, type F96T8, 4,500° white, instant-start lamp is installed in the top rail of each section. Lamps operate from 300-ma. tulamp ballasts installed within the posts. The top rail is an aluminum extrusion, minimum thickness 3/16 in., semicircular in cross-section with 4½-in. radius. Dustproof flat lenses of clear plate glass, set at an angle of approximately 11° above the horizontal, provide protection from dust and damage. Two aluminum lower rails are also aluminum extrusions, ovaliform in cross section and sloped so that their normal axes intersect at the approximate eye level of motorists driving across the top of the dam. The intermediate rail is used as a raceway for wiring between power supply and ballasts. The 528 lamps in the lighting system require about 48 kw., furnished at 110/220 volts, single phase.

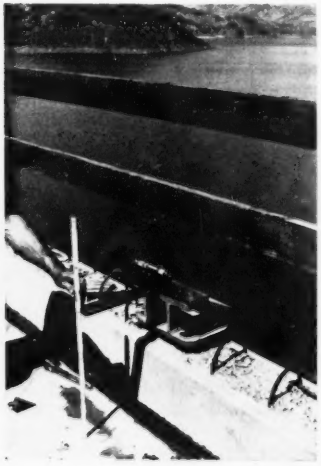
Above: Night view of fluorescent roadway lighting. Center and lower left show aluminum handrailing. Leveling post to perfect alignment (lower right)

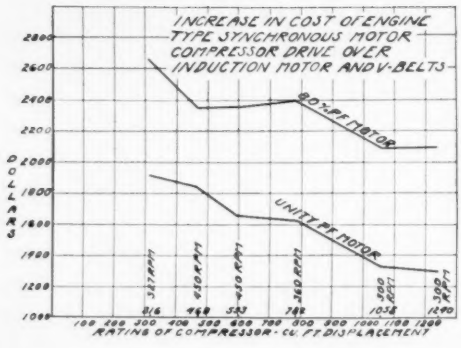
Cast aluminum posts of 3/8 in. thickness are used to house the ballasts. All posts, except the back corner posts in the coaster gate recesses, are provided with access covers for installation of ballasts. All aluminum surfaces were given a satin finish by use of emery followed by an anodic treatment. Anchors are steel castings each secured by four anchor bolts embedded in concrete. A mineral-type insulation gasket separates the casting from the aluminum post to prevent any tendency for electrolysis to develop.

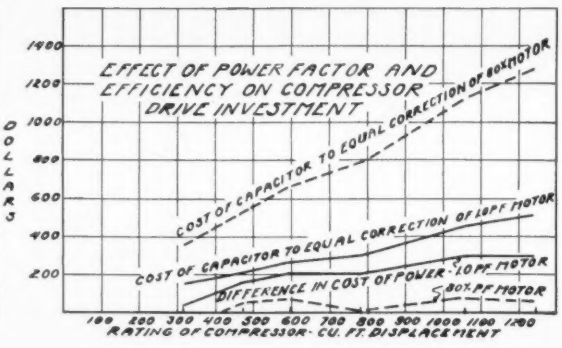
Reflectors for the lamps are of aluminum having a specular finish with reflection factor of 82%. Light output from the fixture is directed on the roadway to give an average intensity of 3 f-c. Design called for a ratio of not to exceed eight to one between maximum and minimum light on the roadway at the center and a line approximately 6 ft. from the roadway face of the railing posts. Photometric readings showed a range from approximately 2 f-c at the centerline of the roadway to approximately 12 f-c on the centerline of upstream walk.

The accompanying photographs furnished through the courtesy of the Sacramento Valley District of the Central Valley Project, USBR, show details of construction as well as day and night views of the completed installation. The crest railing was originally designed for Grand Coulee Dam but was diverted to Shasta. The aluminum handrailing was supplied by the Columbia Electric Mfg. Co. of Spokane—government forces made the installation at Shasta.

Upper: Installing post and railing. Center: Insulating strip prevents electrolysis. Details of the post and base mounting are shown in views below




INCREASE IN COST OF ENGINE TYPE SYNCHRONOUS MOTOR COMPRESSOR DRIVE OVER INDUCTION MOTOR AND V-BELTS
80% PF MOTOR
UNITY PF MOTOR
DOLLARS
RATING OF COMPRESSOR - CU. FT. DISPLACEMENT


EFFECT OF POWER FACTOR AND EFFICIENCY ON COMPRESSOR DRIVE INVESTMENT
COST OF CAPACITOR TO EQUAL CORRECTION OF 80% MOTOR
COST OF CAPACITOR TO EQUAL CORRECTION OF UNITY PF MOTOR
DIFFERENCE IN COST OF POWER - UNITY PF MOTOR & 80% PF MOTOR
DOLLARS
RATING OF COMPRESSOR - CU. FT. DISPLACEMENT

Low Power Factor in Industrial Plants—

and what to do about it

W. C. King
Los Angeles

VIII—Should we drive a small compressor with a slow-speed motor or an induction motor with V-belts? Value of power factor correction may be the determining factor in selection.

IT IS quite common to find in the older industrial plants a large compressor driven by means of a 10- or 12-pole motor. Between the motor and the compressor is a belt of majestic proportions, tended and cared for by the operating engineer as if it were one of his children. But the modern machine requiring several hundred horsepower is driven, almost without exception, by a slow-speed synchronous motor. But what of the compressor of medium size—one of about 800-cu. ft. displacement that requires a motor of 125 hp.? Should we mount a slow-speed synchronous motor on the shaft or use an induction motor and a V-belt drive?

In some plants space may be at such a premium that there is no choice but to use the engine-type motor. But let's assume that we have plenty of room and compare the drives purely on an economic basis.

A popular size built by one of the large manufacturers is a 15½x9¾x10 with a displacement of 782 c.f.m. It runs at 360 r.p.m. and requires 125 hp. If we use a 1,200-r.p.m. 440-volt induction motor, our costs will work out like this:

Compressor	$6,256
Motor	1,491
Rails	60
Starter	320
V-belt drive	363
Total	$8,490

If we use a synchronous motor of 360 r.p.m. and designed for unity power factor we have:

Compressor with motor	$8,954
Exciter	608
Control	547
Total	$10,109

It is apparent that the synchronous job is going to cost $1,619 more than the belted arrangement. If we use an 80% PF synchronous machine, we find that the difference is $2,399.

The accompanying curves show these differences in first cost; they cover machines from 316 c.f.m. requiring 50 hp. up to 1,240 c.f.m. with a 200-hp. motor.

Other Factors

The synchronous drive (except for the 80% PF 50 hp.) will operate at a better efficiency than the belted induction motor and will also give us a better plant power factor. Let's check on the same compressor discussed above. Difference in efficiency:

Efficiency of induction motor 91%	
Then kw. input	102.6
Kw. loss in V-belt drive	1.7
Efficiency of unity PF synch. 91.5%	
Kw. input	102.0
Total difference in kw. input	2.3

If power costs $0.01 per kwh. and operation is continuous, the saving will be $200 per year. Adjustment should be made for the actual cost of power and the actual number of hours operation.

In the same way the saving in the case of the 80% PF motor figures out at only $9 per year.

Value Of Power Factor Correction:

Assuming that the induction motor has a lagging PF of 90.5%, it will have an rkva. of 49.0. A capacitor of this rating will cost $304.

If we use an 80% PF synchronous motor, it will have a leading rkva. of 78. Then to get the same result with the induction motor, we will have to use a capacitor of 127 rkva., costing $787.

If we take the capacitors into account, there is a net difference in cost of $1,314 for the unity and $1,612 for the 80% PF motor. It is apparent that the power saving will take a long time to pay out the increased investment.

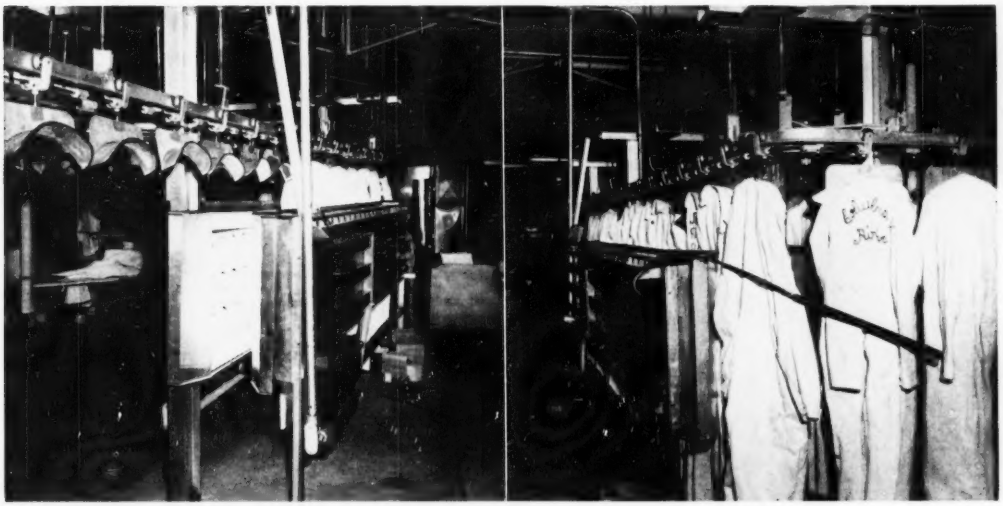
The second set of curves shows the way the efficiency savings and capacitor costs work out.

Another factor is the replacement of V-belts. This seems to be a controversial question and no attempt has been made to evaluate V-belt maintenance costs in this article.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 56

SUBJECT:	Infrared drying.
CUSTOMER:	Northwest Industrial Laundry Co.
TYPE OF BUSINESS:	Industrial launderers, coveralls and overalls.
SIZE OF BUSINESS:	Approximately 200 employees.
SERVICE COMPANY:	Pacific Power & Light Co.
PREPARED BY:	W. A. Gish, industrial sales engineer.



Two applications of infrared heat in the Northwest Industrial Laundry Co., Portland, Ore., have increased productivity of the press units by 25%. Because more moisture is driven from garments by the added heat, there is less for the press unit operators to contend with and their job is facilitated. Garments stay clean longer and hold their press better, too, because the present method permits drying the garments with all the starch left in them. When subject to the action of drying tumblers, much of the starch is beaten out. The Portland concern is one of many throughout the country specializing in uniforms especially designed to meet the work clothing problem of health and safety in industry.

Pressing and drying (see photo) at the same time is done on circular dryers. About $1\frac{1}{2}$ minutes on one for arms and $1\frac{1}{2}$ minutes for the legs, followed by machine pressing, completes the process. Formerly 15 minutes for drying only was required in drying tumblers. Behind the curtains (opposite) are twenty 1,000-watt infrared lamps which supplement the work of the steam heated sleeve forms.

Coveralls and overalls get an extra drying by a trip through the 45-kw. infrared oven shown. This is designed to put additional heat on belts, pockets, and double thicknesses which tend to retain moisture. At left the coveralls are moving toward the left going into the oven. At right is a view from the other end of the oven.

Elimination of the drying tumblers and application of infrared made possible putting garments on a conveyer line system. This reduces handling time and labor and further speeds up the finishing process.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 57

SUBJECT:	Steam generation.
CUSTOMER:	Keep-U-Neat Cleaners.
TYPE OF BUSINESS:	Cleaning and pressing.
SIZE OF BUSINESS:	Five employees.
SERVICE COMPANY:	Pacific Power & Light Co.
PREPARED BY:	W. A. Gish, industrial sales engineer.

This electric boiler was built by Coates Electric Mfg. Co. of Seattle, and installed by W. G. (Bill) Arent & Co., 4246 S. E. Belmont St., Portland, Ore. Boiler has 100-kw. capacity made up of 20, 5-kw. immersion elements, connected in three 3-phase, 440-volt groups, of 30 kw., 30 kw., and 40 kw. each.

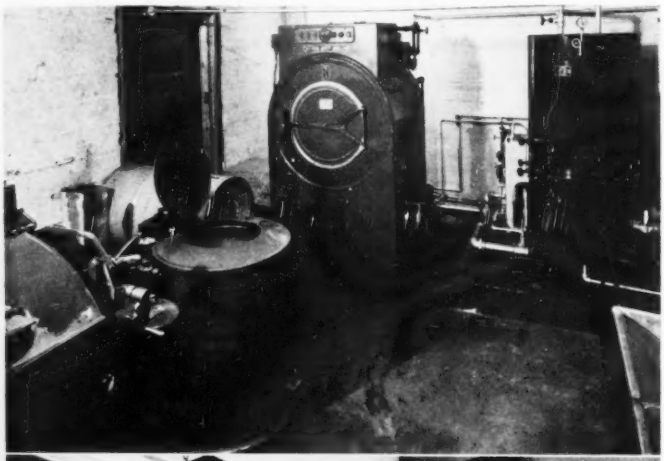
Cleaning and pressing shop equipment consists of:

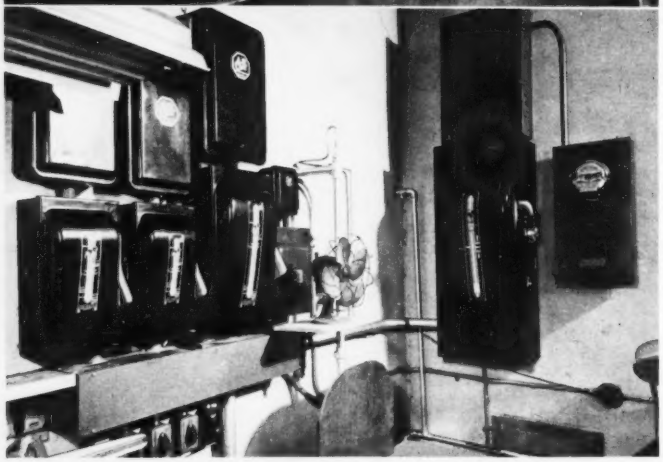
One Hoffman safety tumbler No. 3630.

Two Hoffman press machines.

One Elco spotting machine, model 4000.

Four Hoffman puff irons and one steam iron.





Boiler is controlled by pressure switch, automatically holding pressure at 75 lb. With all three heating element banks connected, it requires approximately 26 minutes to attain full pressure from cold start. When it is desired to run the shop at reduced capacity, the operator sometimes uses only one or two of the three banks of elements. All condensate is returned to sump tank and returned to boiler by pump. Both press machines use steam jet for vacuum. This steam is exhausted to atmosphere.

Advantages

Installation of electric boiler eliminated need for additional space, fire walls, fuel tanks, etc., and made possible installation of equipment in available space. The cleaning plant uses 140 flash solvent, which is non explosive. Boiler is installed in same room with cleaning plant.

Operating Data

Boiler is served from three 25-kva., 11,000 480-volt transformers. Kwh. consumption for the boiler only for an 11-month period is as follows:

Month	Kwh.
March	11,120
April	10,560
May	10,080
June	10,240
July	11,280
August	9,760
September	8,560
October	9,360
November	8,560
December	8,360
January	7,880

Consumption does not include lighting nor three fractional horsepower motors in the shop. Reduction in kwh. between July and September is attributed to more skillful operators on equipment. Reduction in January reflects efforts to conserve power and keep load off peak during Northwest power shortage.

Owner is very pleased with operation of boiler and ease with which plant is kept clean.

Quick Catch-up

IAEI

New Oregon Chapter of the International Association of Electrical Inspectors received its formal charter from Charles L. Smith, secretary of IAEI, Chicago, at a dinner meeting in May. O. T. Fugit is president of the new chapter.

Southern California Chapter, IAEI, recently heard Charles L. Smith, IAEI secretary, discuss code procedure. O. D. Wedeking of Underwriters' Laboratories talked on test procedure of television sets. The chapter's July meeting will be on code discussion.

Elected to head the Utah Chapter at its annual meeting recently, was L. John Christensen, inspector and instructor of the Salt Lake City schools; John Fisher, city inspector, Provo, Utah, first vice-chairman; Ken Williams, Salt Lake City electrical inspection department, second vice-chairman, and Leonard Mitchell, Westinghouse Electric Supply Corp., secretary-treasurer. Christensen succeeds T. E. Myers, city inspector, Ogden.

IEA

J. F. McAllister, vice-president of the Intermountain Electrical Assn., has been made president, replacing Stanley M. Johns, manager of the Salt Lake City office of Westinghouse Electric Corp., who has been transferred to Los Angeles as manager of the firm's southern California area. McAllister's appointment as president of the association was made by the board of directors on May 5. Other officers remain the same. McAllister is residential sales manager, Utah Power & Light Co.

IES

Problems confronting the architect, consulting engineer and residential lighting industry were the main topic for discussion at the June 9 meeting of the Northern California Section, Illuminating Engineering Society. Speakers were Charles von Bergen, architect, and Joseph A. Stein, engineer.

Television and TV lighting problems were illustrated and demonstrated by Seymour E. Johnson of station KFI at the June 1 dinner meeting of the Southern California Section, IES . . . A second meeting on school lighting was held at the Edison Auditorium on June 21.

Oregon Section, IES, held its last meeting of the fiscal year early in June. It featured Richard Feinberg, dean of the college of optometry, Pacific University, on the subject of illumination and vision conservation.

New airport lighting was shown to Utah Chapter members of IES as guests of Robert L. Bridge, Salt Lake City Municipal Airport manager.

Mother Lode Chapter of IES has elected the following officers to serve one year beginning in October: Ralph N. Thatcher, chairman; L. E. Barnum, vice-chairman; Elmore J. Duffy, secretary-treasurer; Clark Baker Jr., and Doyt Early, managers . . . Last meeting of the season was devoted to a discussion of theater lighting. George Smedberg of the Associated Lighting Service explained the technical phases of stage lighting. Raymond Rhoades explained the lighting requirements of the dramatist.

Power Dispatchers

Loyd Benson, dispatcher of Seattle City Light, will head the American Power Dispatchers Assn. as president for another year. Other officers elected were F. D. Parker, vice-president; Paul S. West, secretary-treasurer.

Held Over

Because of the many meetings last month and because space to report all was not available, the interesting and valuable reports of many have been held over until next issue. Matters discussed will be useful and of significance.

Appliance Dealers Assn.

Two television ideas for dealers were the result of a talk on "Seattle Television — T Day Plus 5 Months," presented by Lee Shulman, director of television for KRSC-TV, at a meeting of the Association of Appliance Dealers of Seattle. The association is now working with the station to provide dealers with television program listings in advance, and notes of high-spot programs that dealers can use as liners in their advertising. Also on the program was B. C. McElroy, who presented a talk on "What's New in Record Changers" . . . At an unscheduled session of the group, which followed later in the month, D. E. Anderson of the major markets division of Hotpoint told members what other dealer associations are doing; also gave a report on market conditions . . . The group met twice in May to discuss future promotions — a home freezer show and participation in National Home Laundering Week.

EEI

Kinsey M. Robinson, president of the Washington Water Power Co., spoke at the third general session of Edison Electric Institute's 17th annual convention held in Atlantic City, N. J., from May 31-June 2. His subject was concerned with the importance of utilizing employee effort to preserve private enterprise in the electric industry. Robinson stressed his company's experience in establishing employee objectives and gaining employee support in a public relations program, and the high level of employee morale that has resulted.

Electric Clubs

Electric Club of Oregon conferred a lifetime honorary membership upon Lew W. Going, chief electrical inspector of Portland, late in May.

Larry Soares, electrical chief, City of Oakland, outlined what that city is planning to do in regard to the electrical industry . . . On June 13 East Bay members were guests of the San Francisco Electric Club.

May 23 was Allis-Chalmers Day for the Electric Club of Los Angeles, with featured speaker Joseph L. Singleton, vice-president and director of sales, general machinery division of Allis-Chalmers.

AIEE

Protection for electrical equipment, with a motor demonstration as well as a slide film presentation, was featured at the May 23 meeting of the San Francisco Section, American Institute of Electrical Engineers. Speaker was N. S. Bever, district manager of Bussman Mfg. Co. . . . On June 7 members were taken on a field trip through PG and E's station P near Hunter's Point.

NEWA

D. M. Salsbury, formerly with Westinghouse Electric Supply Corp. in San Francisco, Salt Lake City and Seattle, and now president of WESCO, New York, was elected president of the National Electrical Wholesalers Assn., at the association's recent 41st Anniversary convention held in Cincinnati.

Heating and Ventilating Engineers

Jimmy Sparks, Ilg Electric Ventilating Co., newly elected president of the Pacific Northwest Chapter of the American Society of Heating & Ventilating Engineers, will be inducted into office at the first fall meeting.

ELECTRICAL WEST

Abreast of the Tide

IN business, as well as in the simple processes of living, ours is an ever-changing world. This fact was brought home forcibly to a large segment of the electrical industry at the Coronado convention of the PCEA. Speaker after speaker emphasized the point. Changing technologies bring new equipment and operating problems and procedures. Changing customer attitudes and preferences demand modifications in selling and promotional techniques. Changing political philosophies require new approaches to industrial and customer relations problems. And the changing economic picture demands that everyone in business be alert to assure future survival.

That the people running the electrical industry are awake to these changes and are aware of the new responsibilities and opportunities they involve was evident at the meeting. Ours never has been a static industry. Nor should it ever be. Should that time ever arrive, there will be no need for PCEA conventions.

CVP—Water or Power ?

JAMES B. BLACK did his fellow Californians a great service last month when he spelled out the power aspirations of the USBR in northern and central California. He told the Senate Appropriations Committee that the bureau, in seeking to build a Central Valley Project steam plant and transmission network costing ultimately $85,000,000, proposed to duplicate existing facilities and displace an already established and adequate electric service. The expenditure would not increase the value of the hydro power now produced. In fact, he asserted it would increase the cost to the water users and the taxpayers by $5,000,000 a year. Irrigationists, for whom the project was originally planned, would pay an extra $120,000,000 for their water over the 50-year repayment period.

President Black's item-by-item analysis of the bureau's request for funds leaves no doubt in anybody's mind as to the aim of the powercrats. It is to establish a commercial power operation which would substitute federally financed, non-taxpaying facilities for those built by private enterprise. It would set the USBR up in a tax-free competitive operation to the detriment of the water users of the region.

Four previous Congresses have refused to give the USBR the funds or the authority to undertake such a plan. The majority of Californians, including the farmers, hope that the 81st Congress will deny the present request.

Start Ringing Doorbells

SALESMANSHIP at the retail level, or rather the lack of it, has a lot to do with the slump in electric appliance sales. The zest for selling is absent. One appliance sales manager sums it up this way: "The present crop of so-called salesmen won't learn and they shun work. They want some expert to tell them how to arouse customer interest, how to overcome obstacles and how to close a sale in one easy lesson. And if the lesson takes more than an hour, they won't come." The time is ripe to re-establish an ancient and honorable badge of accomplishment among appliance salesmen. It is the Order of the Calloused Forefinger. Not until doorbells begin ringing up and down the streets of the cities and towns of America will the appliance business get back to "normal." Fifteen years ago Gaylord Buck of the Public Service Company of Colorado told audiences of electrical people all over the West that the competitive sales battle would be won on the doorstep of the American home. That admonition can be reiterated today.

This Is Different

NOBODY will argue over the desirability or merit of President Truman's plan to spread the benefits of American technical and industrial know-how throughout the backward nations of the globe. Any rise in the living standards of other peoples of the earth is certain to be helpful at home. However, one has trouble squaring the Administration's do-

EDITORIAL VIEWS

mestic policies with the proposal that these foreign activities be set up so as to attract private capital. The President wants all kinds of safeguards established to guarantee American investors against loss in foreign countries. Here at home the opposite is true. Confiscatory taxes discourage private investment in industry. And plans proceed at full speed to socialize one of the great American industries—the generation and distribution of electric light and power. A lot of vitally interested people would like to know how the President reconciles the two points of view.

Stand Up — Be Counted

IN these hectic days of ideologies and their subtle struggles for capture of men's minds and emotions, it is a courageous man who will stand up and be counted as an outright advocate of individualism. The sad fierce thinkers have said loudly that it is sinful to be selfish until many are scared into thinking it might hurt their businesses or their reputations if it was suspected they believed in individual liberty and freedom.

Yet as the lines are drawn between statism (by any of its many aliases) and individualism, it may become necessary for more of those who believe in the latter to declare themselves. One who has started it himself as a personal declaration—F. L. Hockensmith of Los Angeles—finds now that his statement of position has grown into a movement. It is a spontaneous one, appealing to the self respect of those who prize their individuality and the system that permits them its exercise in freedom in the United States. His declaration, broadcast widely, is this:

"I am an individual—I am freeborn—I am not subservient to any State or Country and I can worship God according to my own likes. My talents are mine, and mine alone, to develop as I choose. Under the Free Enterprise System, I can work for others or go in business for myself—I can enjoy my leisure hours in play or in study or in pursuing a hobby of *my own choice.*

"I accept my *individual* responsibility of sounding the alarm—of awakening members of my family, business associates, friends, and all others who will listen.

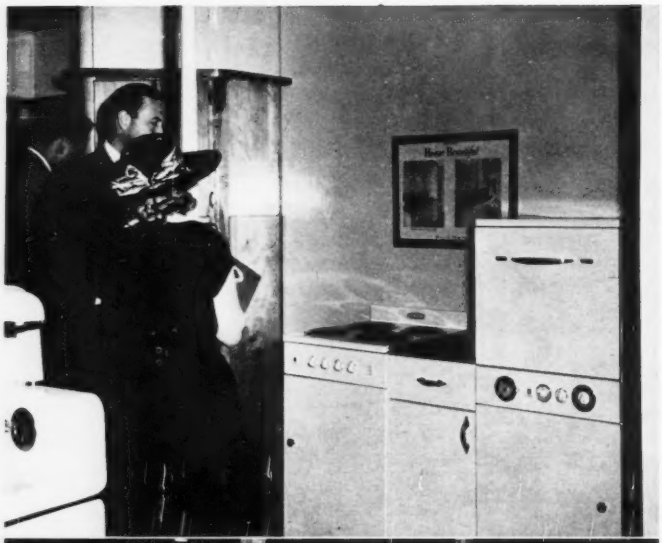
"I accept my *individual* responsibility to speak out against and combat the forces of Communism and Socialism which will destroy my individual freedom and My Country.

"It is better to *stand up and be counted* than be counted while laid out in rows. Therefore, I wear the badge—SU-BC—to announce to everyone within sight and hearing that I propose to *stand up and be counted* for the preservation of Freedom in My United States of America."

An assured way to lose that freedom is to sit back complacently and let it be taken away. In the light of current events everybody in the electrical industry should be perfectly willing to stand up and be counted.

I BELIEVE in the PCEA. I believe in it wholeheartedly and with all my soul, and why not? Through it I have gained my most esteemed, respected and closest personal friends. Through its business and technical sessions I have learned much about the problems of the electrical industry. To it I owe many pleasant, happy and informative hours. Through it I have seen, too, how an industry is both dependent and interdependent upon the members that comprise that industry. It is my humble belief that there is no individual or company, for that matter, who is so strong that in his own best interests he can stand alone and aloof. I urge therefore, greater participation in PCEA both for individuals and for member companies. Wherever necessary, I shall try to bring about the realization that the PCEA, and for that matter every similar industry organization, is not something to be taken for granted, but rather that it is and it can be a powerful vehicle for the expression of the just aims of a very vital and necessary industry.—I. W. Borda, president, Pacific Coast Electrical Association.

New Things Sprung at L. A. Home Show



Electrically the Home Show of Los Angeles, Pan Pacific Auditorium, June 2-12, was divided into two ideas, wiring and appliances. Bulging out into the outdoor space adjacent to the auditorium, the show included three model homes, whose equipment was a mixture of gas and electric appliances. The National Electrical Contractors Assn., one of the sponsors of the show, and the Los Angeles Department of Water & Power exhibited the benefits of adequate wiring. Appliances were shown by some distributors and some manufacturers, many new ones.

Shown for the first time were Thermador's new electric ranges with the griddle on the top surface, with two elements on each side of the griddle. Also shown was its new separate oven made to fit in with standard steel kitchen cabinets and hence providing a high oven for those who desire it. Thermador also showed a new table-top water heater and apartment-type three- or four-burner electric range.

Maytag sprang its new automatic washer for the first time, along with an exhibit of its home freezers and gas ranges. The new Maytag washer has a number of interesting features, among them a completely automatic washing, rinsing and spin drying cycle which can be interrupted, repeated or omitted by manual manipulation of the dial.

An unusual exhibit was that of Elevator Maintenance Co., which showed a Wecolator home elevator that goes up the side of a staircase, the Shepard elevators, homelifts and dumb-waiters, offering something new in a feature for the home. Also shown for the first time was a fluid-drive elevator mechanism made by Warsaw Elevator Co., which, with a single speed a-c motor, provides smooth acceleration and accurate leveling without elaborate control equipment or direct-current generating equipment.

Among the electrical items shown were the following: electric tools, Advance Shopsmith & Consolidated Machinery & Supply; disposers, Waste King, Disposertor and In-sink-erator; appliances, Youngstown kitchens, Easy washers, Carrier freezers and air conditioners, Hotpoint appliances, Ultra-Cold range and refrigerator units, Compact vacuum cleaners, Frigidaire appliances, Filter Queen vacuum cleaners, Thermador appliances, Maytag; household equipment, Marko built-in lighting fixtures, Westinghouse air

Top: Thermador's new separate oven to fit with steel cabinets. Center: Frigidaire contrasted washboards and automatic in its "spring festival." Below: L. A. Dept. of Water & Power pictured the evolution of the American kitchen

Top: Ray Prewitt, A-1 Electric; Jack Rollins, NECA and W. A. Behrentsen, utility, at sponsor NECA booth. Center: Frank Wiggins School apprentices do wiring. Bottom: Exhibit of home elevators offering more electrification

conditioning and heating and Precipitrons, Pryne & Co. built-in fixtures and fans, elevators and home lifts, Trade-Wind fans, Crysler Air-Temp; radio and television, Precision Electronic custom-built sets, David Jones custom-built sets, Transvision, Muntz television, Murphy Cabranet kitchen refrigerators and gas and electric ranges, Eversoft electric water softener, Kitchenkraft ventilated hoods and Ventihood, Utility coolers and appliances; sewing machines, Portman, Domestic, Necchi and Pfaff; novelties, King-sized beds with built-in radios in the head board, also automatic alarm clocks and lights, Pressmaster pants presser, Shryock illuminous signs, Paravox hearing aids, Hollywood liquifier and Vitamix liquifier.

Frank Wiggins Trade School had classes in electricity making 30-amp. service entrance installations as a demonstration of the technique being taught.

Drop Wiring Allowances

Wiring allowances for electric ranges have been discontinued as of July 1 by the Department of Water & Power, Los Angeles, although the water heater allowances are still in effect. This will also remove the reimbursement for ranges moved from one location to another. Likewise it removes any restrictions as to what kind of wiring has to be put in for the range, and ranges need no longer be submitted to the department for approval in order to obtain the allowance. Previously the capacity of the service and entrance equipment and ranges had to be approved types.

Water heater requirements remain about the same, with a $25 wiring allowance and $5 for plumbing when an approved water heater is installed as a replacement for any other type in an existing home. Water heaters are separately metered and must be a minimum of 40 gal. or 50 gal. when an automatic washer is served. Removal of specifications may result in some cheapening of range wiring installation since only code requirements now hold. The wiring allowance had been reduced to $10 beginning this year. The move is interpreted as a means of cheapening wiring cost so that dealers can offer ranges installed ready to operate.

DEALER NET PROFIT IN A SQUEEZE

Two Cost Ratio Studies Show Need for Trade Margin Revision

Two studies of the cost ratios of retail appliance business, one a national one, the other for a marketing area, show that for 1948 selling expense increased, overhead expense also increased, and net profit before taxes was materially decreased. Cost of goods sold remained about the same.

The two studies were made respectively by the National Appliance & Radio Dealers Assn., a national organization of appliance dealers, and independently by the Inland Empire Electrical Dealers Assn., with headquarters in Spokane. Charts from the latter accompany this article.

Taking the 1939 ratios published in *Electrical Merchandising*, September 1940, as the base, the Inland Empire association has made Cost Ratio Studies for the years 1946, 1947, and 1948 on a quarterly and then annual basis. Comparison of the average percentage of net sales of the various items of cost were for the respective years as indicated in the table, which also shows the change from year to year. Net profit before taxes dropped from 10.2% to 5.3%, the first drop since the war. After income tax the average would be from 3.3% to 4.2%.

Selling expense showed the greater increase along with advertising and promotion. Cost of salesmen increased one percentage point but was still more than three percentage points short of the 1939 average. However since that time the market has become a buyer's market which should increase sales and advertising and promotion costs. Administrative and general expense also increased due to higher wages, increased cost of supplies, higher insurance rates, increased collection expenses. More proprietors started paying themselves actual salaries which increased this item.

In commenting on the study, Robert L. Wilkinson, manager of the IEEDA, points out that unless margins are increased to proportions comparable to prewar, net profit virtually will be eliminated, as selling expense is bound to increase. A 20% decline in dollar volume in 1949, already indicated by the 1949 preliminary studies, could increase the overhead expense ratio and, with margins not increased, would bring the net profit to almost nothing.

As corrective measures it is advocated that manufacturers reduce the cost of goods sold by substantially increasing retail discounts and putting more price protection on more goods. Dealers must increase turnover by sounder buying and merchandising, reducing the need of clearances and price cuts, more cautious trade-in policies with profitable resale of traded-in articles and discounting payments to their wholesalers regularly. Overhead expenditures must be kept to a minimum and selling expenditures reviewed regularly to achieve maximum return at all times for expenses incurred. All leakages from credit losses, etc., must be rigidly controlled.

"Manufacturers constantly admonish their wholesalers and retailers that prewar conditions have returned." This, says Wilkinson, is very true. "Practically every prewar condition has returned, every one that is but prewar trade discounts."

The NARDA Cost-of-Doing-Business Survey for 1948 shows 1948 sales up 12% but net profits down, operating cost up, and cost of goods up. This report prepared by Richard E. Snyder, marketing analyst, is sold by the association for $1 and contains recommendations for dealer study of their own costs in relation to the national and regional averages. It also lists cases of four dealers in four different volume classifications who lost money in 1948, and analyzes why. Its survey includes revenue from service parts and supplies and operations. Analysis is also made by geographical divisions. It is interesting that in Region 4, the Mountain and Pacific states, percentage change in dollar sales was up 4% but profits were down 40%. Operating and administrative costs were higher, as well as occupancy and publicity, although cost of goods sold were relatively lower than in other regions.

As pointed out by Wilkinson, 1948 was still predominantly a seller's year. From now on it will be a buyer's year when competitive conditions and reluctant customers require further increases in selling costs, when reduced volume increases the percentage allocations to overhead, when slower turnover will require more capital to carry inventories, when more capital will be required to carry increased credit business. Unless trade discounts are increased, he points out, the time-honored institution of net profit is likely to become extinct.

Inland Empire Electrical Dealers Association Operating Ratios of Inland Emipre Appliance and Radio Retailers

Item	Ave. percentage of net sales during year 1939*	1946#	1947#	1948#	Change 1946 to 1947	Change 1947 to 1948
I. Net sales	100%	100%	100.0%	100.0½		
II. Cost of goods sold	64.9	72.9	70.5	71.0	−2.4	+0.5
(Gross margin)	(35.1)	(27.1)	(29.5)	(29.0)	(+2.4)	(−0.5)
III. Operating expenses:						
A. Administrative and general	12.1	8.8	6.1	7.8	+0.7	+1.7
B. Proprietors' Salaries			3.4	4.4		+1.0
C. Selling expense:						
1. Salesmen	7.7	3.1	3.7	4.6	+0.6	+0.9
(Average of reports listing cost of salesmen)	....	...	(4.3)	(5.8)		
2. Advertising and promotion	2.6	0.8	1.8	2.3	+1.0	+0.5
3. Other selling costs	3.7	0.9	1.2	1.7	+0.3	+0.5
Total selling expense	14.0	4.8	6.7	8.6	+1.9	+1.9
D. Occupancy Expense	3.5	3.4	2.0	2.0	−1.4	
E. Other Operating Expense	3.5	0.1	1.1	0.9	+1.0	−0.2
Total operating expense	33.1	17.1	19.3	23.7	+2.2	+4.4
IV. Net profit	2.0	10.0	10.2	5.3	+0.2	−4.9

*From a study of 24 U. S. electrical stores—**Electrical Merchandising**, September 1940
#Cost Ratio Studies, Inland Empire Electrical Dealers Assn.

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © JULY, 1949

Get Hot on Freezers

THERE is a good market for home freezers and the time to sell them is **now.** Fresh fruits and vegetables are in season. Women are thinking in terms of the canning season. Why not make it the freezing season instead! Canning is hard work, takes long hours. Freezing is simple, easily and quickly done. The quality of food preserved by freezing is far superior to canning. Frozen foods retain all their minerals and vitamins, look and taste better.

Undoubtedly the best approach to selling freezers is to dramatize the economy and benefits of frozen foods. The owner of a freezer SAVES.

MONEY—Buying in quantity purchases the food that is in season enables the owner to save on food bills, at the same time get the pick of the crop. Freezing fresh fruits and vegetables from one's own garden is another money-saver. Unit buying of commercially frozen food is economical too. You can eat better for less.

WORK—Tedious shopping, waiting in line, making unnecessary trips to the grocery store are all eliminated with a home freezer. It enables the owner to plan ahead on her shopping, make trips to the store less frequently. With an ample supply of food in the freezer the housewife is able to meet any emergency, serve unexpected guests.

FOOD—Left-over food can be frozen and stored. There is no waste when you own a freezer. No chance either of getting tired of one kind of seasonal food and having to throw it away. Just freeze it and put it away for another season.

TIME—Frozen foods require only about half the cooking time of other foods. Commercially frozen foods require no washing or cleaning to prepare for cooking. Meals can be planned ahead, quicker and with greater ease for the busy housewife.

In addition there is a great deal of pride in owning a freezer. It gives the housewife greater variety in her cooking, makes meal-planning a pleasure instead of a task. Every home can enjoy any food at any season of the year.

A natural tie-in with the home freezer is the electric roaster. The portability of the roaster makes it convenient to have it wherever the freezer is located. If the freezer is in the basement or room off the kitchen, the roaster can be plugged in right next to it. Preparing foods for freezing is a simple procedure with these two appliances working hand in hand.

Freezer selling is specialty selling. The more you know about the freezer the more enthusiatic you can be about selling it. Of course if you own a freezer you can tell even more effectively from personal experience its countless advantages. Know all the features of your particular brand of freezers. Any information you can give your prospect on packaging and preparation of foods for freezing is just one step further in selling the freezer.

Freezers lend themselves to dramatic presentation. Displayed prominently on the sales floor and filled with a variety of foods, the freezer itself can create interest to the customer. Each type of frozen food displayed is a starter in selling freezers.

How to get started again at

Outside Selling

by

Ken Hampton

IT is one thing to say—do specialty selling; it is another thing to know how to start. Here is a suggested way to get started on the outside of your store selling job with salesmen inexperienced in house-to-house selling.

Send your salesman out to demonstrate the proper use of each major appliance as soon as it is installed.

Next, send him out to call on one person each day who has used an appliance sold by your store for a month or more.

This call will enable the salesman to learn the advantages the customer gets from the appliance expressed directly and in the own words of the housewife.

It will enable him to suggest further ways in which the customer can use the equipment and gain good will for your store.

It will enable you to sell accessories for appliances already in use; to uncover needs for other merchandise you sell in this user's home and will help keep your store in a preferred position to trade in obsolete or worn out appliances for new ones profitably.

It will help your salesman gain confidence in his ability to sell house to house because it will enable him to uncover prospects among the friends and relatives of the user on whom he is calling. Often he can obtain the user's permission to use her name as sending him to make the call. Sometimes the user is willing to call up the friend and make an appointment for him.

A second immediate way that should be employed by all stores is to make home calls on prospective buyers who have visited the store but have not purchased.

All floor salespeople should be instructed to introduce themselves to the people they show merchandise to in the store and obtain the customer's name and address. If the customer does not purchase, a home call should be made to give the customer more information on the product she is shopping for.

This home call can often be arranged to give the salesman a chance to talk to other members of the family.

If no prior appointment has been made, it is often well to deliver something such as a new cook book if the need is for a range, a log book if a radio, etc. to the home and thus obtain a favorable chance to tell an additional sales story.

Your salesmen will soon find they are welcome both in your 'customers' homes and prospects' homes in their effort to sell electrical appliances.

There is a real reason for this. Electrical equipment in the home makes life easier and happier in many ways. A woman who has once owned a vacuum cleaner does not go back to a broom—rather she seeks a better electrical cleaner.

A worn-out washer might be replaced with an automatic washing machine, but never with an old-fashioned corrugated wash board.

Radio owners all over the nation are not discarding their radios, rather they are looking forward to receiving television. The acceptance of electrical living is such that home owners everywhere are interested in learning more about it. The interest is a door opener for your salesman and an opportunity for him to sell.

Use the user and follow up store prospects to get salesmen trained to be a more efficient part of your merchandising and business promotion plan to meet normal competitive conditions that are here in 1949.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

July 1949 ©

Top industry men will highlight San Francisco's Appliance and Radio Trade Dinner, the electrical industry's big event during Market Week, says George L'Amoreaux, promotion manager for the Mart. Hotpoint's president J. J. Nance will be out from Chicago, and Julius Klein, vice-president of Caloric Stove Corp. from Philadelphia. Summer Market Week runs from Aug. 1-6 with the theme "Fortunes in '49."

Trade dinner speakers

W. A. Bless, vp of Avco and gsm of Crosley, stopped in San Francisco for a few days to give Crosley dealers a pitch on general business conditions and company outlook. California Electric Supply Co. played host at the dinner meeting on June 30 at the Fairmont Hotel. More than 600 northern California dealers were on hand to watch a fast-moving show with animated displays of the 1950 Crosley range line and new Shelvador "lucky 7," with 7-cu.ft. capacity and trigger-action door latch. Crosley review was also presented in Phoenix, Los Angeles and Portland. Bless' advice to dealers: "Don't overstock at the dealer level. Buy only a 30-day supply of merchandise." . . . "Business outlook is good," said Bless. "Probably by fall, surely by December, labor costs will be stabilized, management will have washed out all its inefficiencies, excessive inventories will be liquidated and Christmas buying will be heavy - all will have a stabilizing effect on business."

Crosley's advice

All phases of home economics got a thorough review at the American Home Economics 40th annual convention in San Francisco from June 28-July 1, with parallel sessions of specialized groups going on each day, plus manufacturers' exhibits, many of them electrical, attracting crowds at the Civic Auditorium. Pre-convention session of the Home Economists in Business, June 26 and 27, emphasized electrical equipment, the importance of home economists in the electrical business. Details next issue.

Busy gals

Army PX's and Navy Ship's Stores are going to pull in their necks, which have been way out. They've sold at discount and tax-free many lines, including appliances, in competition with retailers. After Congress heard the story meetings between the brass and the retailers may bring two curbs - one will be a restricted list of items PX's can carry; the other a price limit on items to keep out luxury goods. This may solve sales to non-military personnel. Excise tax exemption may not come off.

Govt. relief

Our Washington Bureau also says FCC is about to loosen up on some UHF bands for TV. Present channels won't be touched. New converters to make all sets pick up UHF telecasts are the answer. FCC may license color TV if it can be developed within present channel width and bring color reception on today's receivers. — More bands

With business sagging retailers associations are asking Secretary of Commerce Sawyer for relief from excise taxes and proposed minimum wages. Maurice Nee, National Retail Furniture Assn., heads the 32 association committees asking this succor. Only relief in sight is in simplified tax returns. — Exorcise excise

The Northern California Plumbing & Heating Assn., 16 of its firms and 14 officials, were indicted by the San Francisco grand jury on charges of price fixing, June 22. Two of its officers were also charged with perjury. It's part of the anti-trust drive against high building costs. — In a fix

Florida legislature restored Fair Trade with a new bill, passed with big majorities. It repeals the old Fair Trade law criticized in a recent opinion of Florida's Supreme Court. The act passed was a model one prepared by the American Fair Trade Council. — Restore Fair Trade

Meanwhile an amendment to the California Fair Trade law which would have rendered it meaningless, was killed in the government efficiency committee. It would have enabled individual dealers to set their own prices on trade-marked brands, the very thing the Fair Trade laws prevent to keep them from being used as lure to sell other wares. Eight states fought off attacks of similar nature. — And keep it

Well now, gas is getting it - electrically. First it was light, then electric clocks to time cooking. Now Thermador has licensed O'Keefe & Merritt to install electric fan heaters in its gas ranges. — Burp

Drive-in theater patrons can be warm too now. A combination electric heater and speaker, designed to hang inside a car window carries sound from the movie and heats the car in cold weather. All the comforts of home - plus! — Hot pix

Jim Nance, Hotpoint's president, has reassured the company's 10,000 dealers - and the public through ads - that jittery prices won't drop much more as production schedules will now follow actual needs. And that there's more value at today's prices than prewar. — Reassure on price

Sunbeam's surprise was its "revolutionary" new electric shaver - wide instead of long and narrow, giving twice as much shaving surface as even its recent Model S. The new wide, squat shape is easier to manipulate over face and neck. Four rows of slots catch the curly hair, 1,750 holes catch the others. A new, compact real brush-type motor operating a crankshaft makes its blade swing faster. Sells at a dollar more than the previous model. — Wide shaver

Now there's a switch plate that sings the baby to sleep as you turn off the light - plays 20 minutes of Rock-a-bye in one winding. Made by Mazda Lighting Corp., 4806 Santa Monica, Hollywood. — Music for dark

Streamlined new Sunkist electric Jucit features oscillating strainer of the commercial models. Made by Chicago Electric Mfg. Co. — Juicer

Comparing appliance sales in 1948 and 1949, Henry Rice, domestic sales manager of Southern California Edison Co., notes that the average of the 500 reporting dealers sold 776.2 appliances in 1948, but at the 1949 rate for the first four months 1949 sales per dealer will only be 580.6 appliances unless each recognizes the trend and sells hard. Percentage of sales are up only on air conditioners, heaters, clothes dryers and TV sets. Yet money available for buying is high, government reports contend.

Sales barometer

Thermador sprang some new ones at the Los Angeles Home Show - an apartment size 3 or 4 unit range, a table top water heater, two models of electric ranges with 1,500 watt temperature controlled griddle between divided surface units, and a steel cabinet style oven for built-in range, to go with steel kitchen cabinets and still have a high oven.

Griddle is hot!

Be glad you're not in Socialist England. The "electricity supply authority" is going into radio and TV set merchandising in a big way. Also the "electricity board" underbids contractors on house wiring. Dealers and contractors complain (with little effect) that the state can conceal many of its costs in giving them cut-throat competition.

Rotters

Gibson is putting on the market its second horizontal home freezer, a 10-cu.ft. model with storage capacity of 350 lb. of food. Suggested price is $349.95. Its latest 7-cu.ft. upright freezer stores 250 lb. of food with four compartments plus a tilt bin for storage of packaging materials.

Two freezers

Motorola has added a consolette TV set with a 12-in. picture tube to its line. Retail price is $349.95. Viewing screen is in the shape of a truncated circle. Also announced that it has reduced its 12-in. table model TV set from $369.95 to $329.95.

Video model

Cory has published a service manual for its distributors and service stations giving repair instruction on its push-button automatic coffee brewing system. Booklet illustrates with photographs each repair problem.

Know how

Frigidaire has equipped its new line of cabinet sinks and kitchen cabinets, as well as table model electric water heaters, with Vitalast working surfaces. Claim for the composition is that not even a burning cigarette will mar its heat-resistant surface.

Impervious

Special feature on Universal's 8-cup Coffeematic is a "flavor selector" which can be set to mild, medium or strong and automatically brews coffee to the proper strength. Red signal light indicates when coffee is ready to serve.

As you like it

Fresh'nd Aire Co. has announced a 60-day price protection policy for distributors on all its products purchased after June 1. Distributors can't assign their rights of protection to retailers, says the company.

Price protection

Stewart-Warner has started shipments on its first TV table receiver with 12-in. cathode ray tube, listing at $325. Cabinet has a recessed frame, providing a "stage setting" for the television image. Also has a new 10-in. table model at $259.95.

TV setting

Hoover has dropped the price of its newest model vacuum cleaner from $59.95 to $54.95. Has also made a special offer of the model at $49.95 plus the user's old cleaner, no matter what make. National ads will start publicizing the offer this month.

Cleaner news

TV sales picture in San Francisco has brightened with station KGO-TV on the air and more and better programs from KPIX. Sales have showed a steady increase in the past three months. May sales were up 26%. Total TV sales in San Francisco through the month of May were 3,152. In the Los Angeles area total estimated number of TV sets sold through May was 140,400, or about one set to each 10 1/3 families. — TV figures

Adequate wiring and latest electrical appliances were featured in a model home opened to the public in Salt Lake City recently, sponsored by the Intermountain Electrical Assn. The home was built by Jack Jacobs of Apex Electric Co. Electrical equipment was furnished by local distributors. — Model home

Universal's latest addition to electric ranges is a Speedliner with "Stor-o-cabinet" - three full-size storage drawers providing ample space for cooking utensils. Has all features of the other Speedliner ranges. — More space

Claim for the Davis Electro-Sweep, new type electric home cleaner, is that its brush sweeps 3,500 "whisks" a minute. Cleaner has a lightweight plastic housing, retails at $19.95. Underwriters approval. Davis Mfg. Co. will preview it in July. — Sweeping action

In cooperation with the television industry Southern California Radio & Electrical Appliance Assn. has put out a brochure answering some of the questions uppermost in the minds of TV set owners and prospective owners. — Video info

Practisale is a new feature of Kelvinator's current sales training program for its salesmen. Sales picture of the prospect is outlined on printed forms, varying for each product. Trainees act as prospects and salesmen in practicing the technique. — Practice selling

Thor has a new Gladiron rental program for its dealers, suggesting a rental fee of $1 a week. Fee applies on the down payment of an ironer. Participating dealers will get special promotional materials. — Try-out

For commercial lighting salesmen Edison Electric Institute has put out a compact slide viewer with a set of 43 full color slides illustrating outstanding Planned Lighting installations of commercial establishments. Viewer weighs only 20 ounces, fits in the palm of the salesman's hand. Viewer and slides may be ordered from EEI, 420 Lexington Ave., New York. — Seeing is believing

Lightolier has come out with some "budget" enclosed close-to-ceiling fixtures designed to use 60-watt bulbs. Air flowing upward through an opening in the die-cast knob carries excess heat out through a second ventilation space at the top. Available in sizes with one, two or three lights. Included in the series are two 75-watt wall bracket fixtures in one and two light designs. — Ceiling 60

Norge Division of Borg-Warner says that it is cutting prices from $10 to $40 on its domestic refrigerator models. Biggest reduction is on its 8-cu.ft. model from $339.95 to $299.95. . . Frigidaire too reports a $5 to $10 drop in prices of four more refrigerators. Recently announced $10 to $23 drops on 13 models. — Price drops

Eitel-McCullough will manufacture metal 16-in. TV picture tubes at its new Salt Lake plant, says W. W. Eitel, president. — TV tubes

Klauber and the report he didn't read

Ernst Smalley Borda

PCEA Convention Appraises Change

TIMES change quickly. The past six months have brought many changes. In a business that has to stand on its own feet, this has to be reckoned with. It was timely and extremely valuable therefore that the electrical industry had such an opportunity when the Pacific Coast Electrical Assn. held its 1949 convention at Hotel del Coronado, Calif., May 25-27, for the program of this convention was designed to review the changes confronting all branches of the business in their over-all relation to each other.

Change in national outlook, change in the situation of supply—both of materials and power—change in industrial conditions, labor, a shift into a buyers' market, and shadows cast by the international epidemic of socialism, all call for individual and business change of tactics.

M. A. Sues, Sues, Young & Brown, Los Angeles, president of PCEA, called this reality to the convention's attention in his opening address. A battery of other prominent speakers at the general sessions supported his remarks and extended the details. Then the three sections of the association broke into a number of parallel small discussion meetings or larger group meetings to explore the possible effects of these changes on the successful operations of the industry in the months ahead.

L. M. Klauber, San Diego Gas & Electric board chairman, in his welcoming address proposed to deliver at some point during the convention an hour-long discourse entitled: "The History of Electricity from Its Discovery by Thales in B.C. 583 and Its Subsequent Loss up to the Time of Its Rediscovery by the REA in 1934, Together with Animadversions upon the Effects of Television on Thursday evening Peaks and Whether Losses Thereby Incurred Should Be Charged to Account 116 (Interest During Depreciation) or Credited to Account 389 (Fixed Assets Transferred from Convention Expense Accounts)." He was still carrying the huge manuscript awaiting such an opportunity when the convention ended.

The individual speakers' messages are condensed in these pages, their salient points and details thus made available to others who could not attend. Registration was 676 men and women, yet this is but a fraction of the PCEA membership. To all members and to all in the industry these reports contain the essence of the program. Only the gracious social and recreational features of the entertainment at the convention are missing, and of course one of the great values of a convention is in the friendships renewed, the acquaintances made, the personal exchange of ideas and fellowship.

Marshall C. Wells of the Sues, Young & Brown Co. was an able general convention chairman, whose many committees showed excellent teamwork in making the multitude of details work in coordination. Attendance committee chief was D. D. Smalley, PG and E; banquet was in charge of J. A. Long, Southern California Edison. Harold Q. Noack, an old hand at it, organized the manufacturers' and distributors' cocktail party. A. I. Benedict, San Diego Gas & Electric Co., handled golf. Hi G. Dillin, newly named vice-president of the same company, had charge of the hotel arrangements. Paul Corriere, Coronado manager of the company, was a much complimented host for ladies entertainment, which included a novel water carnival at the pool featuring a Navy amphibious demolition team of swimmers.

Credit for the excellent program goes to the committee headed by R. G. Kenyon, Southern California Edison vice-president. Publicity was ably handled by A. X. Schilling, same company. O. R. Doerr, PG and E vice-president, handled the reception committee. C. C. Potts, Westinghouse, and his committee registered the large crowd. Sam W. Scott, Graybar Electric Co., Los Angeles, was head of the ushers.

Stage Manager William de Waard and Transportation Chairman S. R. Robinson had been injured in an auto accident in January but their assistants carried on ably for them and all were glad to see both present at the convention, recovered from their injuries. Les C. Kobler, San Diego Gas & Electric Co., and his assistants handled stage and properties. Howard B. Wylie, San Diego Gas & Electric, looked after transportation committee leadership.

Victor W. Hartley, managing director, and J. R. Lazarus, northern California manager of PCEA, were active in all phases of the convention.

The following reports give the general session speakers' papers, each in some detail, and highlights of sections and of individual group meetings. This issue carries in full the talk presented by Stanley M. Johns (see p. 57), and other papers from the convention may be run in full in later issues.

Besides attendance from the PCEA

territory—California, Nevada, Arizona and Hawaii—the convention drew several visitors from the East, among them O. C. Small and John Biggi of NEMA, New York City.

Our Future Heritage

Fischer S. Black

Editor, Electrical World

THIS country leads the world in electricity supply and utilization because business enterprise saw the potentialities and developed them. The industry has grown from 1½ million kilowatts and 40 billion kilowatt-hours in 1920 to 56 million kilowatts and 280 billion kilowatt-hours in 1948. Beginning with almost all of the generating capacity in 1920, the private power companies are now four times their 1920 size and are providing 80% of the generation. Total capitalization of these utilities is almost 16 billion dollars, of which about 49% is in bonds and long-term debt and 51% in ownership by common and preferred stockholders. These securities are widely distributed among institutions and many thousands of individuals. Thus it is that the power companies commonly termed "private" utilities are truly public in ownership.

After weathering a serious crisis during the period following the 1929 crash, the second World War and the worst power shortage in the country's history, the industry now emerges well prepared for a decade of sustained growth. There are no signs that the indu-try will hesitate in its 10 billion dollar expansion program with 17 million kilowatts to be added by 1951.

Engineering achievements in the development of our great power systems are outstanding and are monuments to our free enterprise system. Our engineers have a way of keeping step with each new scientific advance by adopting it for practical use in a minimum of time. Improvements on the horizon in the field of generation include the use of Austenetic alloys up to 1,600° F., gas turbines fired with pulverized coal and boilers using atomic energy. Use of re-superheat is winning acceptance as experience is gained in operating flexibility. In generators we will find improved insulating materials in the field of plastics, higher excitation voltage, use of hydrogen cooling at 30-lb. pressure and better physical properties in field and stator windings.

In transmission experiments are being conducted on equipment and structures for 500 kv. Future developments in underground cable will probably be in the direction of lower costs and higher voltages. Use of buried cable in voltages up to 33 kv. is practical and cheaper insulation is being sought to replace lead sheath. Improvements in transformers will come in the field of core forms and insulation coordination. A great expansion is the use of new communication and telemetering equipment is still ahead.

Reliability and simplicity have been the rule in the advancement of distribution system design. For the future it is expected that the trend will be toward use of bare conductor in all localities where tree conditions permit; use of aerial cable for primary and secondary circuits; secondary banking of distribution transformers; statistical method of supervising load on distribution transformers in residential areas; expanded use of secondary networks; elimination of delta primary and use of secondary capacitors.

Kobler

Hartley Wells

Cooperative business development in the electrical industry dates back to 1895. In 1914 the Society for Electrical Development representing 279 power companies, 173 manufacturers, 568 contractors and 262 jobbers started a promotion with the slogan "Do It Electrically." Now 35 years later we have a new slogan—"Of Course—It's Electric." This merely emphasizes the fact that growth has only come to this industry through promotion and that same method will be the only sure future salvation—selling and more selling.

Looking ahead to 1955, we can see a potential goal of a 50% increase in the use of electricity, and along with this you will need something in excess of a 50% increase in revenue to provide for the added system requirements—capital additions of some two billion dollars a year.

If this goal is to be reached, strong men must arise now and lead our great industry in its fight for freedom and continued economic strength. Let us not sit back and let our would-be competitors reap the benefits of progress through private enterprise. For only with renewed effort will there be a guiding star to the great potentialities of our future heritage.

Some Economics of the Power Business

Richard E. Mittelstaedt

President, California Public Utilities Commission

PERHAPS the most concrete and concise statement of the obligation of the electric industry is contained in Section 13 of the California Public Utilities Act. Section 13 requires our utilities to provide services and facilities that are adequate, safe, and efficient without discrimination under rules and regulations and at rates which are just and reasonable. While the act specifically applies to the public utilities as therein defined and the commission therein established, it seems to me that in spirit it should guide every segment of the industry whether that segment be a manufacturer, a wholesaler, a retailer, a service man, a distribution agency, or the regulatory body. Certainly if the public interests and the customers' needs are to be well served, neither the commission nor the utilities which it regulates can completely perform the task without the assistance and cooperation of the balance of the industry.

While the job of physically supplying our electric power requirements

remains formidable, the economic problems seem even more complex. As in the past, we are again witnessing a period of peak plant expansion which is occurring coincidentally with maximum material and labor price levels. In spite of the fact that inflated costs apply only to newly added plant, the proportion of new construction is such as to increase substantially the per customer costs almost without exception. Although some relief has resulted from the large amount of refinancing at favorable interest rates in the last several years and from economies of operation and improved efficiencies, the steady rise in costs presents a serious challenge to the entire industry.

New appliances, devices and applications, placing increasingly critical and sensitive demands on the continuity, reliability, and variability of electric service, require steadily increasing refinements in equipment and operations. At the same time that the home, the farm, the store, the factory, and the research laboratory demand greater and more expensive refinements and closer control of frequency and voltage regulation and greater capacity response, entailing constantly increasing performance costs, large metallurgical processors or chemical producers are searching for lower and more favorable electric rate levels.

I think we can perhaps all agree that our primary responsibility is to expand our resources and improve the character of electric service at a pace consistent with sound economic growth. The financial penalties of over expansion are perhaps as severe on the industry and its customers as under expansion and must be as carefully avoided. While the general objectives can be concisely stated with little chance of fundamental disagreement, the specific implementation of such cooperative programs are far more difficult. The "adequate wiring" campaigns sponsored jointly by all segments of the industry are excellent examples of the cooperative approach which is needed.

It does seem, however, that in developing new applications, greater integration between manufacturers and dealers and the distribution agency could lessen some of the troublesome problems which can arise. To illustrate opposite extremes of the same problem, a residential customer recently complained to the commission that a bill of $85 was excessive for one month's service to his home. Upon investigation it was found that a concrete slab floor had been poured over an electric heating cable and that the design of the installation was extremely inefficient. To our engineers it appeared that the customer was confronted with a continuation of the high bills or abandonment of his investment in heating facilities. Obviously some segment of the industry erred seriously in permitting such an installation to be made. On the other hand, one of our manufacturers of electric heaters, conscious of the unfavorable demand characteristics of electric heaters, has devised a method of load-limiting control which is claimed to reduce materially the undesirable features of electric heating loads. Such

Mittelstaedt Black

developments by the manufacturers and encouragement of such trends by the dealers cannot be commended too highly. When new devices or service applications give consideration to utility economics and reduce or hold down utility operating costs, real progress is achieved.

Another trend which is becoming more pronounced and which should be encouraged is a more critical analysis of utility operating costs not only for the company as a whole, but also by various classes of service, and by various area subdivisions. I am sure you will agree that much of the progress which we in America have made, flows from our industrial ability to reduce costs and consequently broaden the potential market for our products. In establishing prices for utility service, and that is in effect what we in the commission do, it seems desirable to strive for rate schedules which would make each class of service stand on its own feet. Subsidy burdens or increment cost advantages to special classes should be avoided in so far as possible or fully recognized if adopted. One cannot deny that, in many applications, utility service is in direct competition with alternative service. Sound competition is healthy and must not be stifled. However, prices established to meet competitive conditions should not be permitted to react upon prices in the noncompetitive spheres of operation in such a way as to increase the latter prices above adequate compensatory levels for such service alone.

I believe that the industry, in order to retain public confidence, must be willing to recognize those fields in which competitive service can serve more economically and should frankly acknowledge to the public the economic advantage to the customer of the competitive service, provided, of course, such competitive service is itself not artifically priced.

Individualism and Idealism

Dr. George C. S. Benson

President, Claremont Men's College

"THE fundamental principles upon which American civilization has been developed start with the utmost development of the individual in contrast to the totalitarian conception of development of the state," Dr. George C. S. Benson, dynamic young president of Claremont Men's College, pointed out at the opening luncheon on Thursday. "This individualism keeps business free from excessive government control but maintains idealism, as witnessed by this 'capitalist nation becoming the world's most generous nation.'"

Other important traditional American beliefs, Dr. Benson said, include decentralization of industry, the rule of law, free private enterprise, tolerance, the individual's social responsibility and democratic criticism of authority.

He warned that if the government takes on additional services, "opportunities for individual action will be correspondingly reduced, while political liberty will not survive the loss of economic liberty.

"These values (of the American way of life) seems so real and important that one naturally wonders how any responsible person can object to them or advocate action which is contrary to them. There are, however, two groups of opponents of these values both of which claim to be more realistic and more idealistic than are the exponents of individualism."

Dr. Benson identified the two groups as the Marxist-Leninist communists and the "non-communist haphazard collectivists." The latter, he said, are misled by a mistaken idealism creating opportunities for communists to put over communist doctrines. "They have, in general, supported the bizarre collection of economic control mechanisms which now vitiates our governmental and economic life and lends fuel to the fires of communist arguments. Some of their weaker-minded

Benson Hicks Sues Goodwin Sherwin Quinton

members become communists or fellow travelers."

Dr. Benson advocated a program for action against the growing concept of the welfare state which would: (1) make the fight for economic and political individualism a more intellectual one; (2) emphasize the spiritual values underlying our concept of individualism, and (3) direct education toward a clearer emphasis on basic intellectual values.

"We must come back to hard thinking on the part of all of us," Dr. Benson said, "or our tradition of individualism is doomed. Our individualism must be idealistic but the idealism must be sane and sensible."

There is a Tide . . .

Ray E. Untereiner

California Institute of Technology

THERE are essentially only two ways of living a political and economic life. You can have compromises between them, temporary compromises, but you're moving in one direction or the other. The two ways can be described as the authoritarian state, dictating to its citizens—the man the servant of his government. That is the way of Russia; that was the way of most nations before America showed the way to freedom.

The individual counts for very little in that sort of society. What matters how many Russians are sent to the salt mines if the Russian state be aggrandized. That was the way of Hitler's Germany, the way of Mussolini's Italy. The individual is a cell in a political society. Only society counts the pain and suffering of the individuals, the opportunity and aspirations of the individuals. Those things are of no importance. Only the state and the heads of the state matter.

The other way of life has been the American way: the state as the servant of the people; the state charged only with the duty of laying down broad rules under which each individual can seek his own welfare in his own way.

Now in order to preserve that second concept—which was their concept—which was the concept for which they fought a very dangerous revolution against their British masters, our founding fathers laid down certain safeguards in our Constitution, safeguards that prevailed and protected American freedom until our day.

First they established a principle of a limit to the national government, that all powers not granted specifically or by necessary implication to the federal government are reserved to the people and the states. This is a limited national government, with the perfectly clear concept that any time government becomes all powerful, the individual is no longer free.

Now the second safeguard by which the founding fathers tried to preserve individualism and individual freedom against the encroachments of unlimited government was the tripartite division of the powers of federal government. Even the limited powers that were granted to the federal government in the Constitution were to be exercized by three concurrent equal, independent branches: The legislative branch, the executive and the judiciary. Each had some check upon the other.

Our founding fathers were afraid to have even limited powers fall into the hands of the same man, or the same group of men. In our day, we have seen a concentration of the virtually unlimited power of the federal government in one man, the occupant of the White House. Power has gravitated to the chief executive until the Supreme Court is little more than a puppet. And Congress is not discharging its obligations. It has delegated lawmaking to a group of bureaus—1,141 of them.

Well, I could say a great deal about these legislative bureaus. We have a great many of them doing a lot of duplicating work and wasting a lot of their time and our money. We have 93 of them taking care of lending money to us; we have 64 of them taking care of public relations departments. That's a good deal—that public relations business—we have 25,000 full-time federal bureaucrats spending $75,000,000 a year on propaganda to get us to think the way the administration thinks, or to get Congress to vote the way the administration wants it to vote.

There's a lot of waste there, we know that, taking a lot of our money. That isn't the interesting and the important thing. The important thing is that our laws are being made not by our elected representatives, but by unknown men for whom we have never voted, who have never been approved by the men for whom we have voted, who are not responsive to our will or wishes.

Finally what's happened to the economic safeguards to our freedom? They were written in the Constitution too. We believe in individualism and we bolstered it with certain, definite economic institutions.

The first was private property. We told a man: You go out and earn something for yourself, the government will protect you in your ownership of it. Well, now, all we take away from him if he earns enough is about 30 per cent in federal taxes after he has paid his state and local taxes. Private property and capital goods isn't very much of a privilege any more.

We believe in the incentive system, believe that everybody should be en-

couraged to produce as greatly as he can. Everyone should be encouraged to use his own initiative and go out, get things for himself by serving his fellow men. What do we do with the incentive system when we tell organized labor through our government: Boys, don't try to get more money by doing a more honest day's work, that's the old-fashioned method. You get more money by getting together a monopoly organization and beating it out of management and beating it out of management's customers. And the government will back you up.

What have we done with the incentive system for farmers? We guarantee them that whatever they raise, whether anyone wants it or not, we'll see that they get paid for it.

What are we doing to the incentive system for businessmen with our fair trade practice acts, with our encouragement for business to get together? How much incentive are we leaving to business with our present tax rates? And Mr. Truman wants four billion dollars more.

There are things for the government to do, important things. If the government will provide us with decent money to work with, if it will provide us with a fully competitive economy by encouraging the competitors to come into the field, if it will restore our opportunities and responsibilities as individuals, then we can build for the future the kind of America that we want. The tide is all the other way. There's no assurance that an enslaved America can ever build prosperity. But there's ample proof throughout America that free Americans can.

Now Is the Time

Ray W. Turnbull

General Electric Co.

THIS electrical industry of ours is a fighting industry and I think this gathering is a proper body to undertake the battle which is a part of our American heritage and our American responsibility. This industry has been progressive, has recognized change, in fact, has invented change. No other industry has brought to the American people equal improvements in its services and greater reduction in costs.

In this matter of costs, notwithstanding your contribution, the politicians have told the people about the monopolistic practices of your organizations and the abuses to which you apply that monopoly. I wonder how many utility people have ever thought that the American public has not been told effectively enough, at least, of the amount of its electric bill that you collect in taxes? Perhaps no other American industry collects so high a percentage of its revenue dollar to pass on to the government as you do. When the politician talks about this high bill—what is it, an average of $3 per month?—I wonder how many of your customers know that about seventy cents of that amount you have collected to turn over to the government. A reduction in those taxes which you are carrying, were they known, would represent a very great bargain for the public.

Now this economic and political misinformation that so clouds the

Turnbull

minds of the public can be laid more directly at the door of business leaders than at the door of labor leaders, communists or politicians. Too few business men have realized the need or have had the courage or the energy to go about the job of correcting this misinformation and teaching the American-success brand of economics. Every sane man would take immediate steps to combat a far less destructive, a far less competitive action applied to the commercial side of his business.

Our people know where we stand when we state our position and they judge our attitude as being a destructive one when we remain silent. I don't want to stress that point, but have we been vocal enough when we have had a right story to tell?

Now success has been challenged in American industry for the first time in the history of our country. Do you recall that in political campaign statements of a year ago or more the public was led to believe that success in business indicated bad practices—that bigness was badness. Overlooked entirely was the fundamental fact that nothing grows in this country without the approval of the customer for goods and services. The measure of success is determined exactly on the value that the customer in his own judgment determines is right for the service rendered to him. No bad practices have built your industry or any other industry.

You know someone has said that America would never be licked by swords, but drop that first letter "s" and you have the most lethal of weapons—words—when they are used on only one side of a subject.

It is evident, therefore, that we have a job to do. This is a job that cannot be delegated to associations or institutions or groups of businesses, or communities. It's an individual job. It is a grass-roots individual and company job. Every day it is a challenge to you to do a much-too-late job of adult education, the subject being the history of American industry and the philosophy of practical American business.

The great freedom of our country is the freedom of choice. Choice is what happens when people make up their minds between two alternatives. In order to make a wise choice, they must be aware of the two alternatives and not solely of one side of the question. This is a job for the very top management of each company to take down through the management group and through each organization out to the public.

It is of such importance that I would venture the opinion that, if you don't do it and devote all of your time to competitive business practices, then you won't have a business to work on. It is a right serious question as to whether or not we can outlive the lack of understanding of business by the voters of this country.

Now this job of industrial education is a big one. Three million people reach the working age in our country every year. All of these and all the others in our great labor force are going to have to be reached with the facts, just the truth about our individual businesses.

One of the most important factors in this educational job is the rekindling in the hearts and the minds of these young people who come to work for us an unquestioned belief in the American opportunity system for those who are willing to become the uncommon man, to those who are willing to apply to their work the honest effort and keen interest that will make them stand out.

I urge that you accept the responsibility to discuss the questions of the day with your employees. They will respect you all the more because you have brought to them your opinions on the questions of the day.

One final thought, and this is a pet idea of mine. It is that the great investment we have in young men is not being capitalized. If we are going to sell the young men of this country the idea that it still is a country of the opportunity system, we must do something about it specifically. Our task is

to see that they do know about it and do not guess about it. As these young men get out of school and join your organization, will you maintain their high ideals, will you encourage their ideas and, above all, will you continue to keep ever before them the daily opportunities that American business and American industry and America itself has to offer to them?

Government of Men

Fred B. Mitchell

Fred B. Mitchell Co., San Diego

THE expanding national government threatens the American system of government, Fred B. Mitchell of San Diego director of the National Association of Real Estate Boards, warned PCEA convention delegates in Friday's luncheon address.

"We are no longer governed by laws but by men. We have ceased to be a republic and have become a bureaucratic or centrally controlled federal government. They (the bureaucrats) make rules and regulations which have the force and effect of law which are to be interpreted and enforced by men who are political appointees and not elected officials. This is a government of men. This is a real threat to the form of government guaranteed to us in the constitution."

Thus Mitchell opened a discussion on the subject "Current Trends" in which he presented facts to support his assertion that the transition from a free state to a welfare state is almost complete.

From a realtor's point of view, based specifically upon rent control and public housing legislation, Mitchell drew parallels in socialization between public ownership of utilities, socialized medicine and aid to education.

He pointed out that:

1. Civil Service regulations have broken down. The bureaucrats have taken over.

2. The expansion of government, at a time when our national income is declining, is designed to create an unbalanced economy. They know in advance that the government will impose further controls and restrictions in a futile attempt to correct the chaotic conditions, they, themselves, have created.

3. The political patronage system is now being used in the open for the avowed purpose of perpetuating political control.

4. We have yet to find any indication on the part of any high official that we are to receive any relief from the continued expansion of government and the inherent dangers implied through such expansion.

Zwiener Mitchell

Willson Johns

"We are no longer opposing Democrats or Republicans," he said, "but we are opposing men of both parties who, through compromises, are committed to the old world philosophy of government through which a perfect foundation is being laid for a totalitarian government, name it what you will."

Rules or Business?

O. K. Coleman

Edison Electric Institute

THE wiring installation part of the electrical business warrants the attention of the best brains in the industry if the industry is to continue to prosper, and its customers are to get the greatest economical and social good from it. How can this tremendous business be regulated? Do we need laws or special local rules? Wouldn't it be nice if the industry—all branches together with the public—could get together and work out some reasonable standard on a democratic basis and govern themselves? Then the whole country could do the same kind of job the same way, use the same kinds of materials and devices, permitting quantity production, the lowest unit cost with the maximum of safety. Now here is a strange thing—WE "GOT" IT! We have what should be the envy of every industry in our National Electrical Code; made by the industry and the public in a democratic fashion and both formally and practically accepted as an *American standard* for safety in electrical installation. Even those thousands of special rules, usually for some purpose other than safety, use the "Code" as a standard to veer from.

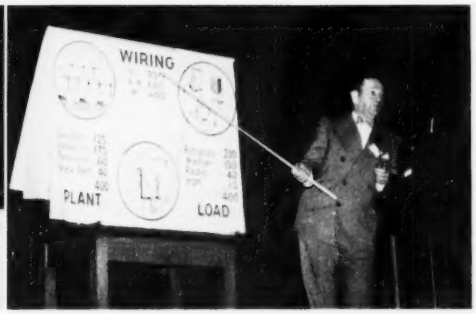
There have been two valid objections to the code-making procedure: (1) It takes too long to get a desirable and necessary change made and (2) there is no opportunity for open hearing for the industry or public at large. The code sponsor—the National Fire Protection Assn., a non-profit organization to which any group or individual may belong—has just recently changed the procedure to overcome these objections. Whereas the code has previously been revised periodically every two to five years by a large committee of about 100 men after months of caucus and sub-committees, then working night and day in session for a week, it will now be done by a number of small panels of the best qualified from the industry and the public working continuously. Necessary revisions can now be processed rapidly and formally approved in a matter of a few months. Annual revisions will become a matter of course, even for minor routine changes. At each annual meeting of NFPA the Electrical Section will hold "open house" for discussion by the whole membership, or to hear the "public" as it cares to speak. It is felt by practically all code students that this change in procedure will make an even better code.

The code has been progressive, and has staved up to date, neglecting the time lag of the old procedure which should now be largely overcome.

Altogether our code is today with little question the best document possible for the purpose, although each requirement is probably objected to by someone. On the other hand, it is the consensus of, and is made by, the industry and the public, and can be further improved whenever the industry or the public really want to improve it. It should be made clear that the code, by agreement with all concerned, is a *safety standard*, not an installation manual, and the provisions of the code are a *minimum*.

Are special local rules needed, and do they serve a purpose? Apparently many people feel they are needed, in view of their prevalence. An examination will show also that many are intended to serve a useful purpose,

Robinson



Hunt Coleman

Practically all branches of the industry are responsible for some or other of them.

For instance, the utilities want to control the method of meter installation; the contractor likes over simplification in order to know before hand what competition might do; labor would like rules that supposedly would provide more man-hours, etc. Although some or all of these ideas may have their place, there certainly is a better way to handle these situations than through local ordinances or state laws.

Utilities are entitled to their own specifications for meters and service installations for common-sense engineering coordination, and most state public utility commissions recognize them—such specifications are just as effective as law and under full control of the utility. Full active competition for contractors invariably makes more business available for all. Increased business is also a sounder method of producing more man-hours for labor.

We could review many restrictive special rules included in some state laws and many city ordinances. These for the most part take a pattern—requirement for conduit when non-metallic sheath or armored cable would do a better job; prohibit the use of service cable, which is the best method in many cases, such as rural areas where grounding is a problem, or along the coast where corrosion of conduit produces a hazard and is an expensive nuisance; restrict the number of outlets on a circuit leading only to a reduction in total number and encourages the hazard of long extension cords and octopus outlets.

In the long run they all tend to increase cost, thereby reducing service and outlets to the customer, reducing income of contractor and labor, and resulting in all kinds of homemade "hay-wire" hook-ups which really produce the hazards of electrical wiring. It could for the most part safely be said that the special rules in general are more apt to impair than assure the safety for which they were claimed to have been adopted.

The way seems clear—united and unqualified support of our National Electrical Code—get it changed when, as and if needed—give the whole country the advantage of the local improvements. Then sell wiring installations. Use all those good organizations whose avowed and laudable purpose it is to help sell—the Adequate Wiring Bureau—the local trade associations. Use the *Handbook of Residential Wiring Design* and *Handbook of Farmstead Wiring Design*, or other published information. But *sell*. Preserve one of the most important freedoms we have—free competition. Careful analysis indicates that *selling* is a better business tool than *special rules!*

Who Killed Bill Evans?

POTENT arguments for greater interest in safety were advanced in a skit entitled *Who Killed Bill Evans?* presented under the auspices of the Safety Committee at the Friday general session. The playlet was adapted by W. A. Cyr, ELECTRICAL WEST, from the record of an actual accident investigation. The audience sat in as members of the investigating committee appointed to seek the causes for the death of an apprentice lineman, Bill Evans.

Basis for the investigation was set up in an opening announcement which said:

"Who killed Bill Evans? Was it carelessness on his part? Was it lack of training? Was it faulty equipment? Was it poor management?

"Every accident could have been prevented. But is it as simple as that?

"Bill Evans was an eager young man, the type that everyone wants to have in his organization. Yet he was killed by a falling boom on a line truck as it was being readied to set a pole. This type of accident is all too common. It happens not only in utility operations but in those of contractors and of industrial plants."

A number of witnesses were called and interrogated as to their versions of the accident. Invisible witness was the deceased, whose voice interrupted the proceedings at critical points to emphasize some of the measures that might have prevented the accident.

At the conclusion of the testimony the announcer's voice summed up the investigation as follows:

"Whose responsibility is it? Is it management's? Should there be more supervision? Should there be more written rules? Should more time be taken in practice with equipment to point out both its operations and its hazards?

"The war against accidents and death goes on unceasingly. The safety supervisors and instructors cannot fight it alone. They need your assistance and your sympathetic understanding. For it is your life and mine that they are trying to save.

"The principles of the safety movement—the elimination of accidents—are vital to the public interest. Accidents produce economic and social loss. They impair individual and group productivities. They cause inefficiency and retard the advancement of the standard of living.

"The elimination of physical perils in accidents; the development of a sense of individual responsibilty and an attitude of mind conducive to the avoidance of accidents; and the general dissemination of education to increase the safety of men, women and children—all these constitute the safety movement.

"It is enormous in concept and its strength lies in the voluntary participation and active support of all who are in a position to promote safety.

"And this means you—and you—and you."

Members of the cast included E. C. Hunt, PG and E. investigator; Carlton Thompson, San Diego G&E. line foreman; Joe Robinson, *Electrical World*, truck driver; George Tenney, ELECTRICAL WEST, line construction engineer; John Adams, So. Calif. Ed. Co., groundman, and Dan Turner, San Diego G&E. voice of the deceased.

Television Is Free Enterprise at Work

Lewis A. Weiss
Mutual Broadcasting System Inc.

I HAVE always been awed by the genius of our engineers and inventors who reach into the field of phenomena and harness forces that have no history and make out of them energy and forces for man's use and comfort and convenience, for pleasure and entertainment, as well as services.

And with the birth of television which combines all of the dimensions that we've been seeking all these many years, there has come into being a new set of problems which are inherent in the nature of the medium itself. They are costly problems. Broadcasting had rather a modest birth and could be operated at a relatively small cost. Because of its newness it found a tolerance and a patience, as well as curiosity on the part of the public—enabling it to have an orderly and reasonable growth. Television, however, came into being and into active practice at a time when the public's demands were at their highest peak.

They looked to television to provide them with entertainment comparable to what they see on the motion picture screen—pictures that cost several million dollars to produce. They looked for dramatic excellence comparable to what they see on the Broadway stage. The medium in its present state—under the only support that it can possibly get under our American system of advertising—is in no position to provide that kind of entertainment and service, except at a terrific loss on the part of the entrepreneurs.

I find myself growing increasingly irritated at the political comments that are being made by men in high places in our government expressing their fear that television broadcasting and the industry itself will fall into the hands of the large business interests of the community, whom they carelessly refer to as monopolists.

It might interest you to know that, in the operation of one television station in a metropolitan city at the present time in the present state of the art and in the present stage of the availability of revenue for such an operation, the losses average $1,000 a day. To construct and operate a television station in a modern metropolitan city involves an original investment of about half a million dollars. Just how long we will maintain our losses at the present average is measured entirely by the resources as well as the interest and determination of the business interests that are financing this great adventure in progress. And for the interest of our political friends who are so afraid that television will fall into the hands of big business interests, I would submit the very naive question that if big business doesn't carry and bring to the public this contribution—unprecedented contribution, if you please, to man's progress—I'd like to know who will.

One of the great political tools and a psychology which is contrary and even repugnant to our American concept of the free enterprise system is that bureaucrats, who regard themselves as being smarter than anyone else in the world, look with suspicion and a bleary eye at any business that is big or successful. They do this notwithstanding the fact that being big and successful is the proper and legitimate reward for enterprise and risks and application of sound business principles.

Television has brought problems that are inherent and peculiar to it. For example, no one in the entertainment business ever contemplated or was ever confronted with the burden of creating, preparing and producing the amount of entertainment that we are required to prepare and produce for television. All of the motion pictures that are produced in these United States in a year wouldn't provide the television stations of this country with sufficient entertainment for more than two or three months' release. On top of that, those motion pictures are not available to us.

In the first place technically they weren't made for television, and there are many technical reasons as to why a film made for motion picture screen is not well adapted to television.

Uhler Quinton Untereiner Kenyon

At the same time the exhibitors of the United States—the theater owners—will not permit any motion picture producer to furnish us with any film that is less than about ten years old. There are all sorts of complications involved in that, including the rights of the authors and the composers and the performers, and everyone else who has had anything to do with the picture.

Primarily, the public buys a television receiver for the express purpose of seeing on the screen in their home things that are happening when they are happening, at distant places. By the means of that magic carpet they are transported some distance from where they are to see and hear and enjoy an experience that otherwise would not be available to them except at some inconvenience or cost. Everything else that we do on television is merely supplementary to the meeting of that primary need and primary desire of the person who buys a televi-

sion receiver. That's what television is about—to provide that magic carpet.

Technically, as you know yourselves, television has progressed to the place now where installations are increasingly simple and the performance of the equipment, at least, is very satisfactory. Programwise the progress is continuing, whether you recognize it tonight or tomorrow night in looking at your receiver at home.

I venture to say there isn't anything that we do in television today that cannot or will not be done better six months from now. Those of us who have the responsibility for its operation are constantly alerting ourselves to keep flexible in our thinking and are keeping our fingers sensitively on the pulse of our public. We are keeping alert to every new device, every new suggestion or invention that will tend to improve our product, which will be in a constant state of improvement productionwise and technically, as far as any of us can see.

It is a costly process and I think it is a boon and a blessing to this country that we do have organizations large enough and sufficiently richly endowed with ambition and interest to finance this infant industry to the time when it can begin to stand on its own feet. And then in all consciousness, in all fairness within the framework of our free enterprise system, those people are entitled to the fruits of their efforts, the reward for their risks and the opportunity to make a legitimate profit in compensation for their vision and their courage and risk capital involved to bring this art to a state of perfection where it can be self sustaining.

Administrative Services

J. K. Uhler, chairman
L. W. Brillhart, vice-chairman

WITH three outsdanding speakers on its first general meeting of the entire section, the Administrative Services Section almost drained the other sections of their attendance Thursday morning. It was like a convention in itself.

Although Dr. Ray E. Untereiner, economist, California Institute of Technology, spoke later at a general session, he gave his best at the beginning of this meeting. "What's Ahead for Business?" proved an analytical insight into present economic trends.

Flannigan Wright Fox

It is perfectly apparent where we are, said Untereiner. The war, instead of being financed by sacrifice, had been by inflation. Prices, released, went up because everybody needed new things. Business needed new plant equipment, new inventory of materials. The public also needed and wanted everything denied it and would pay "Honest John" anything asked. Now the public backlog has filled. Business is caught with high-priced inventory. It is more vulnerable than prewar because its break-even point is higher. It will mean many can't operate at a profit and will fail.

Reasons for the vulnerability are (1) fictitious inventory profits, (2) high-priced new equipment to be amortized, (3) labor costs are much more rigid than prewar. In some industries labor makes up to 85% of total cost of production. Because of coddling by government, the output per man-hour, which should increase, is frozen by organized labor. If prices drop much, profits will be wiped out and many businesses wiped out, causing really serious unemployment.

Few economists expect a serious depression because (1) the supply of money will not disappear. In 1929 there was heavy private borrowing; today it is government borrowing. (2) There is very little speculation. The stock market has not been speculative, despite good dividends and profits. Even inventories are not speculative; they are only about 190% of a month's sales. (3) The government will not let it happen. It will do more pump priming. Whether it can do much with its already heavy debt still must be demonstrated. (4) Other reasons: Private debt is low. Incomes of farmers and labor are high.

It is difficult to predict, he said, because in the past money supply was the index. Now there's a tremendous supply but the public isn't spending it. Therefore he predicted a considerably more serious recession than his contemporary economists, with eight million unemployed rather than five. His reason—prices are too high, costs are too high. Wages are the cause and won't recede until there's unemployment. "It's too bad," he said, "but we can't have a spree without a hangover." We won't like it, but we can live through it.

The prospect, after it's over, if wisdom prevails, is for a long period of great prosperity and higher living standards. But it depends on *creating* goods and services, not money. The country is in position to create 50% more than in its palmiest days. It has more know-how, the best trained labor force. But it must be done by the process that has always worked in America—"We have worked, saved and invested. We have encouraged each man to look after his own welfare. We have done it by the incentive system, not by government handouts."

"But if the government continues spending at a rate faster than we can create it, we won't have a stitch to our backs. All we'll have are a lot of phoney dollars."

Harold Quinton, executive vice-president, Southern California Edison Co., reassured the section of its importance to management in a talk titled "Rain and Colder." With the economic trends cited by the previous speaker, Quinton said company managements faced storm warnings with a need to "trim ship and batten down the hatches." In this the various groups

Mess Bruce Bradshaw Liecty

in administrative services were highly essential for control and planning.

Purchasing and stores study of markets and materials and handling of inventory is invaluable to operation. In a utility these functions differ from those who merchandise and turn over their stores. Purchases are made for use, and reduction of capital tied up in stores is important.

Bad debts today are growing, giving greater emphasis to the careful handling of credits and collections. The new experience of bi-monthly billing may have to be re-examined in light of a different economy. Yet costs of other systems must be weighed against losses. Customer relations are under greater strain because of collection policies.

The accounting, auditing, budgeting work is vital because management needs it for analysis. During the war there was neither time nor personnel for analysis. Since the war the heavy construction program has, because of haste, made budgeting useless. But times have changed. Figures alone mean little without analysis, which aids the executive to chart the course for the company. Business cannot be run, as some cakes are made, by instinct instead of recipe. Analysis gives the executive the "instruments to fly by, instead of flying by the seat of his pants."

Therefore, Quinton concluded, the administrative services were the most important functions of the business.

With characteristic pungency and witty observation, R. G. Kenyon closed the session with a talk on labor relations in which he asked "What is it worth?" Since this talk is to be printed in full in a later issue, suffice it to summarize here that Kenyon declared any technique or program used in industrial relations must be worth-while. It cannot be indulged in as a fad or a gadget. Such things as testing, jobs evaluation, training, must not be put on a pedestal and worshipped—they must return in net worth to the operation at least a dollar in results for each dollar expended. In exploring this idea, Kenyon analyzed keenly the change in attitude of employees toward their jobs, their bosses, their unions, their government in the past 16 years and the reasons behind the change. He also sketched an idea for making employees feel a better sense of belonging and being wanted and liked which he feels is essential.

On Friday the four groups of the section met in individual session, each of which is reported in the following:

Credit and Collections

K. L. Boosey, sponsor
E. J. Wright, co-sponsor

The speakers at the general session of the Administrative Services Section clearly pointed out that the credit man will play an important roll in the affairs of business during the coming year.

Each of the speakers in the credit and collections group seemed to be well aware of the changing conditions and pointed out the necessity of making preparations for handling a greater volume of delinquent accounts.

John Fox, So. Calif. Ed., presented a splendid paper giving many facts and figures on the subject of collecting from domestic customers who fall within the small-income brackets. He said that additional collectors could be hired to follow up on the increasing number of slow-pay accounts but every consideration should be given to the "break-even point" so that the increased cost of these additional collectors would not exceed the possible losses. He said that sympathetic treatment extended to the many delinquent domestic customers is worth a great deal to the utility and should be given every consideration.

Fred Flannigan discussed the handling of county welfare guarantees. He presented charts showing the trend and increase in the number of cases now receiving county aid and gave comparisons with the situation in former years. He outlined the procedure used in San Diego County and told of the importance of cooperating with the welfare agency so that the utility may know promptly when the county assumes responsibility for an account and when its responsibility ceases.

He said that all information regarding welfare cases is handled through a central office which eliminated the necessity of dealing with case workers in rural areas who very often made deals that could not be approved by the county. In the discussion that followed it seemed to be generally agreed that the welfare agency was very cooperative.

Lawrence Holzman, executive secretary-manager of the San Diego Wholesale Creditmen's Assn., gave the group an outstanding talk on the subject of bankruptcy. He pointed out that many credit men have come into their jobs in recent years and have not had much opportunity to handle bankruptcy cases but should loose no time in making themselves thoroughly familiar with the laws regarding all types of bankruptcy cases. He outlined the important phases of different sections of the act and told of the duties and responsibilities of the referee, trustee and others concerned. His generous response to the many questions by the group indicated that the full session could have been devoted to this speaker.

Holzman had just returned from the National Credit Conference at Atlantic City where he acted as secretary for the public utility group. He discussed the activities and highlights of their meeting in a very interesting manner and stated that the eastern utility credit men like those in the West were stressing the importance of customer relations.

Accounting Group

C. B. Bradshaw, sponsor
J. F. Brennan, co-sponsor

Friday morning's parallel session of the accounting group included three speakers on separate phases of accounting responsibilities and problems:

Machine accounting: Planning and development of a tabulating installa-

tion—In an outline of the problems, pitfalls and planning of a punched card accounting system Everett C. Bruce of Arrowhead & Puritas Waters Inc. stressed the following points:

1. Necessity for advance plan covering a one- to two-year period.

2. Caution against failure to recognize that: (a) people make errors; (b) accounting machines operate on an average of 60% of paper efficiency; (c) personnel processing the work on the machines follow the same 60% pattern of efficiency.

3. Conversion from manual to machine methods involves considerable training of personnel and a complete revision of procedures. A period of three years normally is required before really satisfactory operation is obtained.

An open forum followed Bruce's presentation with a majority of the group participating.

Valuation—Under the topic "Problems Confronting Utility Regulation in California," C. T. Mess, assistant director, Public Utilities Dept., California Public Utilities Commission, gave a brief review of the organization and functions of the commission. The commission's functions, he stated, are of a legislative and quasi-judicial nature. Since 1911 the commission has issued more than 42,300 formal decisions of which less than 25 have been reversed in court action.

A public utility under regulation is not guaranteed a fair return but is less subject to hazards than unregulated, highly competitive enterprises, according to Mess. His paper gave a comprehensive summary of the problems currently confronting utility regulatory bodies and generated lively discussion at its conclusion.

Treasurer's and investment departments—Under the subject, "Forecasting for Financing," John L. Liecty, Central Ariz. L&P, presented an informal talk and question-answer period outlining the numerous considerations that should be reviewed in selecting methods of utility financing; preparation of the three basic budgets, sales, construction and operating expense; reasons for forecasting cash position; timing of the financing operations; the influence of capitalization ratios; and the general problems of the finance officers in utility companies.

Purchasing and Stores

W. F. Ruth, sponsor
William Ismay, chairman

B. D. Haugh, So. Calif. Ed., led the discussion on "Selection and Training of Personnel." He emphasized the necessity of making careful selection of applicants by checking on appearance, personality, education, initiative and references from former employers, also any particular aptitudes that might be developed in future training.

It was brought out during the discussion that there is a very definite need for supervised training of new employees and also a need for continued education of supervisory employees.

As a sidelight Haugh told about a meeting of the EEI he attended in the East and the work that is being done on standardization of packages and cutting down on weights and sizes to make for easier handling and storing of materials in warehouses. Manufacturers' representatives who were present at the meeting agreed that the progress made along these lines would be very beneficial to the utilities and the manufacturers, and that they would cooperate to the fullest extent.

William Ismay, Central Ariz. L&P, gave a fine presentation on "Pallet Storage and Fork Lift Operations." His talk was illustrated by slides showing the various adaptations his company is using for storing material on pallets and in improvised bins and racks that can be handled readily by the fork lift.

Ismay emphasized the saving in square feet of floor space by using pallets and utilizing the "cube space" of the warehouse. He also stressed the reduction in labor costs achieved by this method of storage and handling and the reduction in the number of accidents, such as strains from heavy lifting and injuries to hands and feet caused by manual stacking and handling of material.

The slides presented illustrated the ease of handling heavy reels of cable, barrels of oil, sacks of cement and numerous heavy, bulky and hard-to-handle items. A very interesting part of his presentation was the discussion relating to shipping material and supplies on pallets. Here again the manufacturers were interested and told of the progress and study being made in this field and of some items that are now being shipped to the users on pallets. It was the consensus of those present that much can be accomplished along this line and a great saving in labor and handling costs can be made which will benefit the manufacturer, the carrier and the ultimate user.

Haugh Ruth

Personnel

C. H. Warner, sponsor
H. B. Rountree, co-sponsor

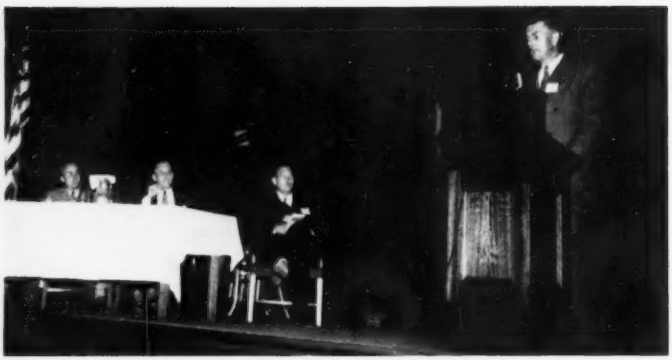
Training is how, education is why, Carl J. Schiffers, vice-president, Hawaiian Electric, said in defining his terms for a talk on employee training and education in Hawaii.

He cited his company as one of the smaller firms that would have been completely disorganized during the war years, if it had not had a basic pattern of training for replacements of skilled manpower.

Because of Hawaii's isolation and the agricultural background of the labor market, the company from its very beginning has carried on an extensive employee training program.

It has used most of the training methods practiced in modern industry, Schiffers said. Aim is to anticipate needs and prepare employees for future openings. Most successful has been a formal 8,000-hour apprenticeship type of training for mechanics, maintenance men, cable splicers, linemen and draftsmen. A combination of classroom and on-the-job training has been a close second.

But despite job training, a lack of initiative and interest in things affecting company welfare was general



Martin Sherwin Rountree Schiffers

throughout industry in the Islands after the war. Employers, through the coordinating efforts of an active Employers' Council, made preliminary studies; then hired a public opinion organization to conduct public opinion polls and employee attitude surveys. Reports indicated very clearly that the less a man knows about his job and his employer, the less he likes either of them, and this in spite of any amount of training in specific skills. It was shown that many of the principles for which business stands were misunderstood by both employees and public.

Hawaiian Electric applied these findings to its own policies, then formulated a long-range program based on an analysis of its operations. First step is to find out what employees think and how they feel toward the company; the next step is to give them the information in the most effective manner. While the methods used in Hawaii probably are indentical with those used by most mainland companies, Schiffers thinks the *how* of using these media is different.

Mixed racial character of the population, agrarian background, language barrier, the insular character of economy, and basic philosophical and psychological differences springing from national and racial heritage — all posed difficulties. "Where you on the mainland strive for simplification, we aim for ultra-simplification," Schiffers declared.

A pictorial presentation is used wherever possible, and the company has built up what it calls chart talks for presentation to small groups on company time and, where possible, in congenial surroundings. Questions are encouraged. If an answer cannot be given on the spot, name of questioner is taken and a reply furnished within 24 hours. Chart talks are not new, Schiffers said, but in Hawaii, many companies carry on such talks in at least four different languages, including pidgin.

Because of the insular nature of the economy, radio is an effective medium for employee education. Program directors have been careful to make radio talks interesting and suited to the tastes of Filipino audiences.

To instruct its supervisors in proper handling of human relations, the company is using instruction based on the Ben L. Wells course (EWEST, Jan., Mar., 1947). At Hawaiian Electric, the program starts at the top and is carried down through all lines of authority. The officer group took identically the same course as the lowest level of supervision.

Because of the centralized, compact nature of the Islands, Schiffers believes that the company has been able to measure to a fair degree the results and he believes that they are sound. "We believe that the most important part of the plan is to have all of industry and business work together in a coordinated effort to put over a sound employee educational program," he concluded. "In this way all employees in a community become familiar with the problems that confront their employers and which have a direct bearing on their livelihood and security."

Winlund Shoemaker Ross MacGlashan

Labor Legislation

Referring to the anomaly between the bad name given by labor to the Taft-Hartley Act and the approval so often expressed by labor with respect to individual provisions of that act, E. D. Sherwin, vice-president, San Diego G&E, reviewed the changes considered most probable of enactment in pending legislation. Despite declaration of complete unwillingness to compromise, Sherwin indicated the belief that desire for settlement was strong enough to force a compromise. Key factor in determining the issue would be the Senate, he prophesied. Comparative strength on opposing sides was fairly well disclosed by the close vote on the conservative Wood bill, he said, and this suggests modification of the present act in numerous and not inconsequential respects but retention of some of the features most bitterly criticised by the Administration.

Personnel Clinic

With Ab Martin, manager G-E Oakland Works, as moderator, some of the previous topics were reviewed as to application in specific circumstances confronting member organizations. Occasional differences of opinion as to practicability of proposed measures were expressed.

There was general recognition that companies today must undertake to educate their employees and, preferably, also the public which ultimately writes the rules under which business must operate. Just as a company advertizes to preserve its competitive position with others in its field, so must industry defend its position as free enterprise in competition with other philosophies, it was pointed out.

when you don't need indication
THIS IS THE CUTOUT TO USE—

It saves you money!

This G-E non-indicating fuse cutout is the lowest in price of all wet-process-porcelain enclosed types. It costs less to maintain—with practically no moving parts. It is the sturdiest cutout built. You can stock fewer replacements—all contacts, fuse holders and other parts have been interchangeable for 21 years.

Backed up by an unexcelled operating record of performance efficiency, and durability, this cutout is the most reliable and economical type you can buy.

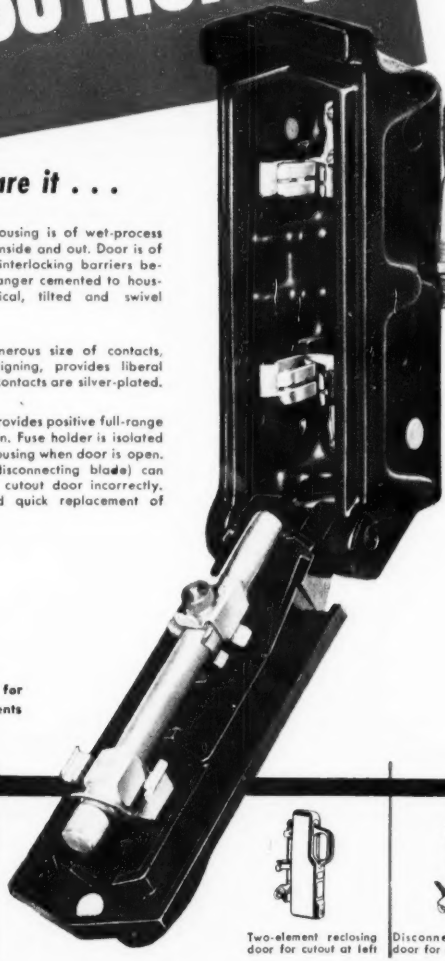
Stocked in 50- and 100-ampere, 5000-volt and 7500/12,500-volt Gr. Y ratings. For complete information, see your nearest G-E representative or write for catalog GEA-2390. *Apparatus Dept., General Electric, Schenectady 5, N. Y.*

Compare it . . .

MECHANICALLY—Housing is of wet-process porcelain glazed inside and out. Door is of Textolite. Double interlocking barriers between contacts. Hanger cemented to housing permits vertical, tilted and swivel positioning.

ELECTRICALLY—Generous size of contacts, which are self-aligning, provides liberal contact area. All contacts are silver-plated.

FUNCTIONALLY—Provides positive full-range current interruption. Fuse holder is isolated from contacts in housing when door is open. Fuse holder (or disconnecting blade) can not be placed in cutout door incorrectly. Enables easy and quick replacement of blown fuse.



Primary Fuse Cutouts for All Service Requirements

Enclosed indicating and drop-out fuse cutout

Two-element reclosing door for cutout at left

Disconnecting-blade door for cutout at left

Open-type fuse cutout with drop-out fuse holder

Flip-open fuse cutout

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities

Discussion also centered on ways and means of making employees *want* to work, since, without such a desire, no large part of a man's latent power to contribute is likely to be realized. Likewise considered was the problem of maintaining the faith of employees when circumstances make it imperative to lay off men, and of treating constructively applications for jobs during times like these, when there are no openings.

Business Development

J. S. C. Ross, chairman
C. L. Moore, vice-chairman

THE Thursday morning opening session began with Chairman J. C. S. Ross presiding in place of vice-chairman C. L. Moore, who was unable to attend the convention. Before introducing the four speakers, Ross brought the members up to date on the work being done by the various committees.

As the first speaker, R. W. Shoemaker, consulting engineer, Oakland, talked on *Current Developments in Electric Radiant Heating*, and supplemented his words with a group of slides illustrating various types of radiant heating installations in use throughout the West. He told the group that there was still unexplored potential off-peak load of tremendous size in the use of electricity in circulating hot-water radiant systems. This probably would be brought about, according to tests, by using a clock switch to override the thermostatic controls during the peak periods of the evening. He explained that only 30 gallons of hot water would carry a radiant system over the 2-hour period of no power. He explained that another development with load building potential is the combination of electric radiant heating and the heat pump.

The second speaker was termed by Ross as a "Daniel in the lion's den." He was Charles B. MacGlashan, manager of the fuel oil department, Pacific Coast Division, Shell Oil Co., with a talk on *LP Gas and its Progress on the Pacific Coast*. With opinions from the LPG side of the industry, MacGlashan opened the eyes of the attending electrical industry with his descriptions of the present progress of LPG and what that industry intended to do to further the production and consumption of that product. He said that during the period 1939-49, sales of LPG had doubled every two years, with the new home market and the increased consumption by users as the main reasons. He stated that the petroleum industry was well able to handle any demands for increased LPG production for many years to come. Biggest industry problems, he reported, were the storage of LPG to meet the seasonal peak demands. However, he told the electrical people, the LPG industry plans to overcome that obstacle by developing larger summer loads that will warrant building larger production facilities. Summer load will be sought through sales of more home appliances, more extensive use of LPG in farm water pumps, for air conditioning in homes and factories.

Decentralization of Industry and the Area Economy was described by Conrad Jamison, assistant vice-president, Security First National Bank, Los Angeles. He said that the trend has been steady over a period of 50 years and that it was devided into two groups: (1) that away from the heavy industrial centers of New England to the South, mid-West and West. (2) that away from the center of a city to the outskirts. He explained that the trend toward the small, isolated town was not as large as believed—that cities between 10,000 and 100,000 are getting the bulk of industry. There is a

Jamison

higher percentage of industrial workers in the San Francisco Bay Area and the Los Angeles metropolitan area than there were 20 years ago. The change has been in the shift of industry to outlying areas still within the periphery of those cities.

The potential electric load to be delivered by the utilities from electronic devices was indicated by Edmond S. Winlund, electronics engineer for Allis-Chalmers Co., Seattle office, who gave the last talk of the Thursday morning meeting. Winlund described not only the many ways in which electronic heating is now being used by industry, but covered many of the new fields in which engineers are now experimenting. On the West Coast, he said, the largest use for electronic heat is in the drying of plywood. He predicted that electronic heating equipment would eventually become a substantial load for the utilities.

Ross presided again at the second session of the Business Development Section on Friday morning, at which the development of the home market for electric power was emphasized in the five talks. From the mid-West came W. C. Conley, general sales manager of the Coolerator Co., Duluth, Minn., to talk on *Selling Techniques and Tools to Increase Freezer Sales*. Conley emphasized to the utility people that "the home freezer has the best load characteristics of any plug-in appliance." To the industry as a whole, particularly to the San Diego dealers who were guests at this session, he said: "anyone who eats is a freezer prospect" and that the "home follow-up is the most important element in freezer selling." As part of his analysis of overall freezer selling techniques, Conley said: "To promote and sell freezers, we must follow the same practices used to promote and sell all other specialty appliances. Take the automatic washer, the vacuum cleaner, the electric range. How were they sold?

Ross Nigg Coatsworth Fenner Conley

UNITED STATES RUBBER COMPANY

LEADERSHIP

in electrical wire and cable value

LEADERSHIP CALLS FOR EXPERIENCE

A century of active participation in the development and manufacture of over 30,000 products, including 70 years in the field of electrical wire and cable, has given our technicians an added skill and knowledge which makes them authorities and specialists in their fields.

LEADERSHIP CALLS FOR COURAGE

So strong and constant has been our desire to produce new and better products, that we have always been the pioneer in our field. Even against odds and at great expense, we have always had the courage to look ahead and to go ahead to new horizons. We have invested in vast scientific projects, have amassed unlimited data and have built great modern research and testing laboratories.

LEADERSHIP CALLS FOR ACCOMPLISHMENT

The result of these efforts have been many amazing products, such as LAYTEX® RU, the world's smallest diameter, lightest weight, natural rubber covered building wire—the new U. S. SERVICE ENTRANCE CABLE with Laytex insulation and Neoprene cover, the first such cable ever approved by Underwriters' Laboratories—the ELECTRIX PLUG, first all-rubber plug ever perfected—USKON, the miracle electrical radiant heat from the ceiling that has completely revolutionized America's heating conceptions.

LEADERSHIP CALLS FOR VALUE

In order to be sure all "U. S." electrical products deliver the utmost performance, there is the close-working team of the U. S. Wholesaler and the U. S. Rubber Salesman. This team is always on the job . . . working out more economical, more practical methods . . . ways to make sure "U. S." products yield the greatest value to purchasers.

LEADERSHIP CALLS FOR VISION

Today, as in the past, "U. S." is still a pioneer in the electrical industry . . . still going forward in its search for scientific discoveries . . . pledging itself to continue the research, the development and the efficiency needed to manufacture new and still better products.

UNITED STATES RUBBER COMPANY • ELECTRICAL WIRE & CABLE DEPARTMENT

1230 Avenue of the Americas • Rockefeller Center, New York 20, N. Y.

By the fundamental sales principle—'Demonstrate to sell—create the desire.' The pattern for selling freezers is identical. By following the accepted pattern for selling specialty appliances, we can build an attractive volume of freezer business."

"Of course — it's electric," said James T. Coatsworth, commercial director of the Edison Electric Institute, who came from New York to present to the members the new EEI program tied around that theme. He said that "the time is rapidly approaching when load building will be a necessity," and that the utilities must make further plans to help the dealers build their appliance businesses. He said that there has been a 23% increase in the appliance market potential through the increase in new electrified homes. At the same time, the people have the ability to buy because their disposable personal income is at an all-time high. The one thing needed will be the "willingness to buy" and that will require salesmanship by the electric industry.

Marguerite Fenner, director of home economics, PG and E. San Francisco, presented a talk which described the Electrical Living Institute which was held under her direction and under the sponsorship of PCEA and others in San Francisco Jan. 26 to May 11. She told how the institute made up-to-date information on electrical living available to an average attendance of 225 people at the 14 2-hour sessions at which 25 speakers participated. Details of this institute have been reported previously in ELECTRICAL WEST.

Brought in as a sales expert from outside the electrical industry, Cyril C. Nigg, president of Bell Brand Foods, Los Angeles, gave a clear analysis of some of the selling techniques which he believed from observation and experience the retail appliance field would have to consider right now if it expected to succeed in a buyers' market. He suggested that dealers: (1) shop other stores to watch for mistakes and practices which they might overlook in their own stores; (2) know the cost of their own business operation; (3) get back to fundamentals of sound selling; (4) sell the comfort, pleasure and enjoyment that comes from owning an appliance, not sell the appliance as an object; (5) try not to farm out service, because the dealer's best prospects are his customers.

The audience was treated to entertainment coupled with sarcastic presentation of what is wrong with much of retail selling today, through a one-man skit created by the National Electrical Wholesalers Assn. and acted by W. A. Cyr as Professor Sylvester (Hokey Pokey) Quarterwit.

Operating Economics

D. R. Jenkins, chairman
F. D. Beardsley, vice-chairman

ENGINEERS and operating men discussed their problems and came up with many answers in two technical sessions in which the eight groups comprising the Operating Economics Section held parallel meetings. Under chairmanship of Donald R. Jenkins, the section has had an active year and leaves behind it a record of accomplishment. A number of excellent papers were presented at Coronado, several by men from the east. Highlights of the group meetings will be found in the following summary reports.

Jenkins Beardsley

Transportation Group

R. M. Middleton, sponsor

Vehicle and equipment requirements by substation, transmission and distribution groups was the first subject of discussion by the transportation group. E. Z. Dixon, So. Calif. Ed., discussed use of mobile cranes for yard and field work, mentioning the 10,000-lb. Hyster mobile crane as best suited to his company's requirements. The adjustable boom makes the crane versatile. It lends itself to substation work since it can be operated in limited clearances. Loading poles, transformers, wire reels and electrical materials are other uses.

Pole handling was of interest to the group. No standard equipment is used except pole dollies. Besides the mobile crane mentioned, other companies have used the Krane Kar of 20,000-lb. capacity. McDara Keany, L. A. Dept. of Water & Power, described special equipment used by his distribution department. Special equipment consists of a 10-ton truck with 45-ft. gin pole connected to a trailer hitch with the base of the gin pole resting on a cam-shaped saddle. The unit handles 90-ft. poles using side guys and a standard double-drum winch. Other equipment described included an insulator washing rig used night and day and a hydraulic boom for setting 55-ft. poles. He stressed the need for smaller and faster transportation equipment, especially for use in outlying districts, desert and mountain terrain. He suggested using trailers to haul material, thus relieving overloading of trucks. Discussion ensued in engineering specific pieces of equipment with the desired speed, vehicle weight, load capacity and grade ability. It was felt a compromise must be reached to satisfy operating departments with respect to speed and pay loads necessary for faster operation and still retain a smaller unit with regard to size and weight. Equipment should be job-rated and designed especially for the job at hand, it was felt.

M. C. Short, So. Calif. Ed., said his company uses three standard-type vehicles in line construction; carryalls to transport men; material trucks — flat racks — of 20-ton pay load capacity for transporting material to the job, and trucks with standard bodies for tools and work equipment. A standard transmission crew consists of 14 men.

H. W. Kinch, L. A. Dept. of Water & Power, mentioned heavy-duty line trucks with 14-man crews, and light-heavy crews with five men. He described an earth borer line truck with four-wheel drive and three-drum winch mounted behind the cab. Also, a hydraulic pole puller capable of exerting a pull of 25 tons.

Tool losses and remedies were discussed. An example was given of reducing this loss from 1,000 lb. per year over a four-year period to approximately 300 lb. per year. This was done by standardizing the tool compartments on line trucks. According to H. L. Rudolph, So. Calif. Ed., his company is almost 100% standardized on maintenance trucks. Since vehicles have been equipped with radio, a-c generators are used to maintain battery current. Handy cranes are used with a special track hoist mounted on top the truck body for lifting bulk units.

H. D. Gerberich, L. A. Dept. of Water & Power, discussed standard-type vehicles used by his department. Jeeps, panel trucks and special trucks were mentioned, with emphasis on panel trucks for cable splicing crews. Relative merits of C.O.E.-type trucks over the conventional cab came in for discussion. The C.O.E. has proved useful in reducing the over-all length and in

HERE'S A TYPICAL TEST
ONE OF 486
THAT WESTINGHOUSE FLUORESCENT LAMPS PASS
A phosphor crystal functions at top efficiency in a fluorescent lamp when its atoms are united in a definite pattern. Here a Westinghouse scientist tests mixtures of new phosphors in the Research Laboratory at Bloomfield, New Jersey.
That's Why Westinghouse Fluorescent Lamps
WORK SO WELL
BURN SO BRIGHT
LAST SO LONG
WESTINGHOUSE
YOU CAN BE SURE...IF IT'S
Westinghouse
THE NAME YOU KNOW IN Lamps

Lawton Hotchkiss Estcourt Thielscher Crellin Avery

providing suitable weight distribution, but presents some maintenance problems. Conventional units are preferred for off-the-road work. Shorter W. B. trucks prove advantageous on mountain roads.

General discussion was had on pending legislation—relative merits of existing laws, effect on utilities, performance ability, gross weight and weight per axle. No conclusions were reached.

Communications Group
R. H. Miller, chairman

Meetings of the communications group were well attended and considerable interest was evinced in all of the topics discussed. A joint session with the substation group heard Ralph G. Maddox, systems engineer of the Federal Telephone & Radio Corp., discuss *Pulse Time Modulated Microwave Communication Systems*. Maddox described methods of modulating such systems, pointed out advantages, both economically and from the standpoint of the large number of communications channels that can be obtained with one microwave radio link. The talk was illustrated with a sound motion picture, in which the sound channel had been transmitted over a pulse time modulated system, and with slides to show the principles of the system. The possibilities of such systems for telemetering and tie-line load control was covered, and systems now in service were described.

R. H. Miller, PG and E, described experiments covering propagation of waves on 950 megacycles for a proposed communication link between Oakland and Newark substation. Tests recently have been completed by PG and E with the assistance of the Stanford Research Institute.

New rules of the Federal Communications Commission covering use of mobile radio by utilities were discussed by L. E. Ludekens, So. Calif. Ed. Co. A comparison with present rules was given and a discussion of operating procedures followed. G. P. Fallon of the Consolidated Gas and Electric Light and Power Corp. of Baltimore, who is chairman of the information sub-committee of the National Committee for Utilities Radio, attended this meeting. He was able to add considerably to the discussion, due to his first-hand knowledge of the proceedings at which the new rules were formulated.

Methods of locating and eliminating radio interference and some of the ways in which television interference appears, were discussed by C. R. Nickerl, So. Calif. Ed. Co. He also discussed methods of eliminating television interference and described some of the typical cases so far encountered.

W. S. Moody of the General Electric Co. described new power line carrier current equipment, particularly mobile frequency modulated and frequency shift telemetering. Several recent installations of frequency shift telemetering equipment were described and the reasons for improved signal to noise ratio due to this method of operation were outlined.

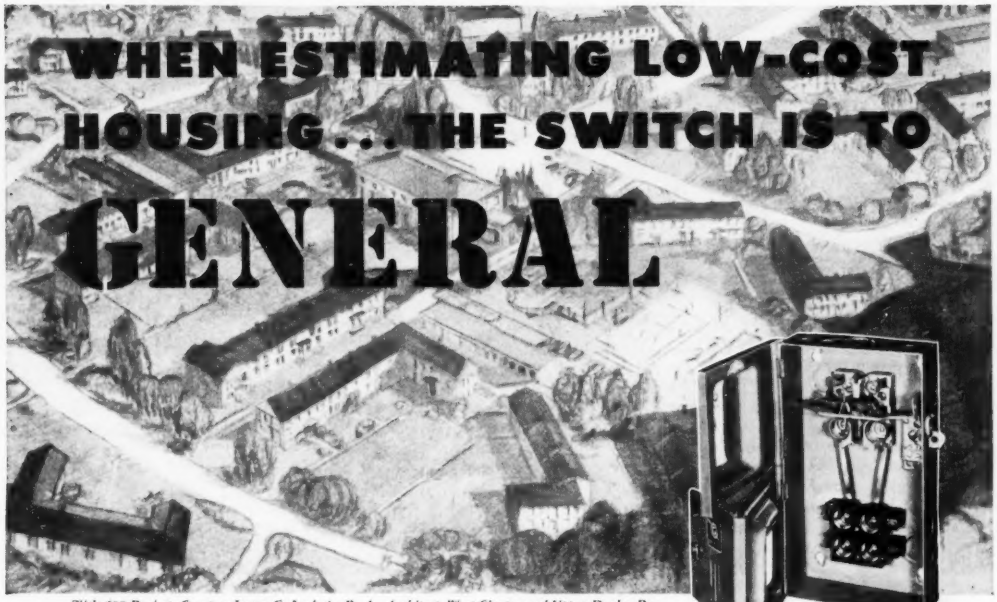
W. U. Dent, Westinghouse Electric Corp., described the electronic transfer unit used on automatic simplex carrier systems and gave a very interesting and original discussion on methods of improving signal to noise ratio in power line carrier telephone systems. Dent pointed out that improved operation of carrier systems is often possible on noisy lines by reducing receiver gain or by selecting proper impedance ratios on the receiver inputs. This is so that the line noise will not be sufficiently amplified to operate the automatic gain controls of the receivers. When the receivers are operated with high gain control settings, due to AVC action, the ratio of signal to noise is held to a very low value with impaired performance of the carrier channel.

Hydro Group
C. G. Crawford, sponsor

The whole principle of governing and the various types and characteristics of governors for hydraulic units was covered by C. L. Avery, Woodward Governor Co., before the hydro generation group. He summarized his discussion as follows: (1) An isochronous governor is used to hold speed or frequency on isolated units. One isochronous governor may be used to hold speed for an entire system if its capacity is large enough to take the load swings occurring during a reasonable length of time. (2) Speed droop governors are generally used when operating on interconnected systems. (3) Units set with high droop will change load less on speed changes than units set with low droop. Therefore, units carrying base load should be set with high droop, while units regulating the system or helping to regulate the system should be set with low droop. (4) The speed adjustment of an isochronous governor operating on an isolated load will cause it to change the speed of the system with little effect on the load on the unit. (5) The speed adjustment of a speed droop governor operating on an interconnected system will cause it to change the load on the unit with little effect on the speed. (6) On a trip-off an isochronous governor will return the speed of the unit to the normal speed; on the other hand, a speed droop governor will settle out to a higher than normal speed.

Tests on three 30,000-kw. units at Electra power house of PG and E were described by Percy B. Dawson, Pelton Water Wheel Co., and F. I. Lawson, PG and E. Choice of methods of determining water quantity flow became reduced to either the Allen salt velocity method or the Gibson pressure-time method. The latter was chosen because it required simpler penstock connections and less interference with operation to install and remove water flow equipment. The Gibson system is based upon stopping the flow and equating the impulse of the water to the momentum of the water column. That is, the pressure rise multiplied by the time over which the pressure acts is equal to the mass of water stopped times the initial velocity. Tests proved satisfactory and yielded much valuable operating information in addition to deter-

WHEN ESTIMATING LOW-COST HOUSING...THE SWITCH IS TO GENERAL



Title 608 Project: Courtesy James G. Ludwig, R. A., Architect, West Chester and Upper Darby, Pa.

Architects, builders and electrical contractors are switching to GENERAL SWITCH equipment because it is:

Available everywhere through leading wholesalers—No lost labor time waiting for GENERAL equipment to reach the job.

Economical to install—Takes less time to install because of compact open construction, integral internal conductors and spacious wiring room.

Thoroughly dependable—Quality materials, rugged design, and rigid factory inspection.

HERE are three units of GENERAL equipment which have been "application engineered" for and are particularly well suited to low-cost housing construction:

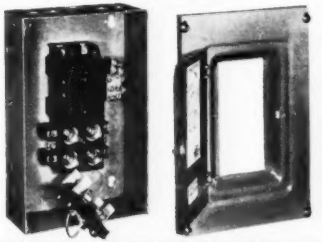
GENERAL SWITCH 33NP4—Ideal selection where an externally operated switch is required in combination with a residence panel at the point of service entrance. Has the advantage of dead front branch circuit fuses yet the entire unit is readily accessible with spacious wiring room. Also available in raintight construction.

GENERAL SWITCH 3614—Where a pull-out switch may be used, this equipment offers economy, versatility and compactness. Available for flush or surface mounting. Has sub-feed pressure connectors which may be used as main lugs, leaving the pull-out switch available for range, water heater or other circuit.

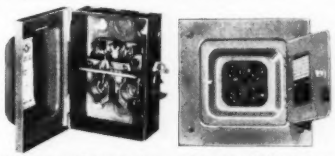
GENERAL SWITCH 33NP and 104—When it is desirable to have the branch circuit fuse panel conveniently located remotely from the switch, this service entrance switch and plug fuse panel has wide acceptance. Residence panel available for flush or surface mounting.

For availability, economical installation and trouble-free performance *the switch is to* GENERAL. Available everywhere exclusively through Wholesalers.

33NP4—EXTERNALLY OPERATED SAFETY SWITCH COMBINED WITH BRANCH-CIRCUIT PANEL—30 Amp, 3 wire, 2 plug fuse quick-break knife blade switch with four plug fuse branch circuits. Bus-bars between switch and fuse block save wiring time.



3614—SINGLE PULL OUT SWITCH COMBINED WITH BRANCH-CIRCUIT PANEL—Available in 30 or 60 Amp with up to 6 branch circuits or in 60 Amp with as many as 12 branch circuits. Surface or flush.



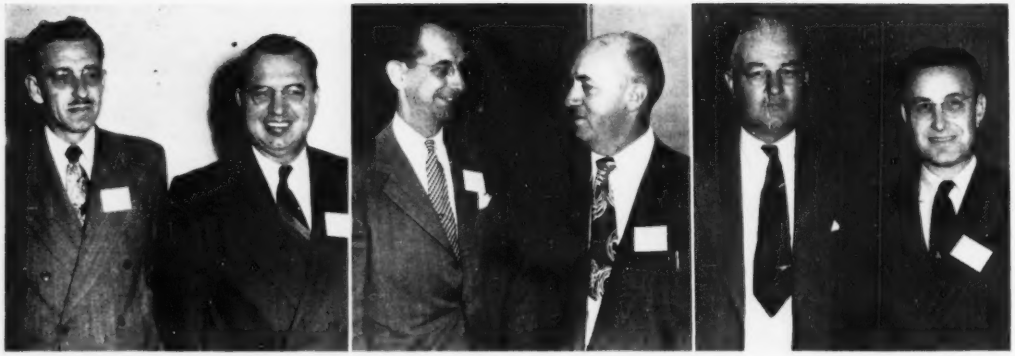
33NP—EXTERNALLY OPERATED SAFETY SWITCH—3 wire, 2 plug fuse quick-break knife blade switch for use as service entrance equipment.

104—BRANCH-CIRCUIT or RESIDENCE PANEL—Available up to 32 plug fuse circuits. Flush spring catch. Surface or flush.

Ask your wholesaler or write today for the GENERAL SWITCH 68-page catalog

GENERAL SWITCH CORP.

49 ROEBLING STREET, BROOKLYN 11, N. Y. • *Sales Offices in every major city*



Maddox Miller Skow Straub Buechner Kipp

mination of efficiency.

John L. Crellin, Pelton Water Wheel Co., who presided in the absence of C. G. Crawford, sponsor of the group, gave an interesting description of the Bridge River development of the B. C. Electric Railway Co. This plant has two 6-nozzle, vertical-shaft, impulse turbines, being the most outstanding turbine design development in recent years and the most radical from the viewpoint of heretofore accepted construction arrangements. The 6-nozzle vertical impulse turbine lends itself to the solution of many difficult design problems. The multi-jet arrangement permits higher specific speeds while maintaining high efficiency. With the development of the multi-nozzle vertical impulse turbine it is now possible to manufacture an impulse turbine for specific speed ranges heretofore not covered by accepted design. Test data on a 1/45-size scale model indicated an efficiency of 89.3%. Such gratifying results not only compensated for the work in building the model and making the test, but insured satisfactory performance of the full-size turbine. Ultimate development of Bridge River calls for ten such units.

Meter Group

E. B. Kipp, chairman

Progress of the public utilities electric service requirements coordinating committee in drawing up service standards was reported by H. W. Bruce. Standardization service requirements for switchboard and so-called EXO metering installations are complete and now available to all member companies. Immediate problems at the monthly meetings are standardization of customers' service poles and overhead service requirements. A similar group in the north under T. A. Bettersworth, PG and E, with 12 utilities represented, are ready to adopt switchboard standards. Work on EXO standards will start soon. Work of the two committees has been of great value in effecting savings to all branches of the industry.

W. H. Lindblad, PG and E, reported good attendance and success of the recent PG and E sponsored and University of California conducted, meterman's school. In southern California many of the utilities have their own apprentice training programs which serve the purpose. Expense of sending an employee to a meterman's school, plus the problem of details with the union, were deterring factors also.

A progress report was made on corrosion of meter sockets by H. L. Buechner, Westinghouse. It was generally agreed that use of dissimilar metals in meter sockets caused much of the trouble. Meters with aluminum base plates and cover rings in place of steel and brass are available and give good promise. Tests indicate that anodized aluminum has good corrosion-resisting qualities. One manufacturer is using a molded base plate with stainless steel cover and sealing ring—which by test is also very good. Field tests indicate that manufacturers are making good progress and that future meters and sockets should have a reasonable life expectancy when used in beach areas.

Various factors causing noise in watt-hour meters were discussed by J. C. Garrett, who pointed out how some of it might be controlled by design and inspection. Discussion touched upon possible use of silicone lubricant to reduce upper bearing noise and the effect of dirt or foreign matter in the lower jewel bearing. It was the consensus that one of the best solutions is to discourage setting meters on bedroom walls.

E. W. Trenkle reported on types of instruments available for load and voltage surveys. Discussion brought out the complaint that, in general, manufacturers have not put as much effort into development of graphic instruments as they have in some other devices.

The new type A meters can be converted readily and economically to socket type, but the older bottom-connected meters do not lend themselves to this operation. K. M. Stevens reported. General opinion was that, due to labor costs, the older type A meters should be retired or used for replacements until they are ready for retirement. F. A. Redding, So. Calif. Ed., outlined requirements of an ideal single-phase test set and showed a sample of a unit built to his company's specifications. It was felt that the new equipment should increase materially the efficiency of the meter tester and enable him to do a better job.

A discussion of primary vs. secondary testing of meters led by T. A. Noble showed agreement that secondary testing of meters gives best results and that primary testing should be used for checking the wiring rather than the meter accuracy. R. W. Marshall outlined advantages and disadvantages of 480-volt potential transformers when used with watt-hour meters. From a safety standpoint, the transformers appeared to offer some advantage, but experience indicates that the 480-volt meters are entirely satisfactory, particularly when used in conjunction with meter protectors to protect against lightning surges. Purpose of the discussion was to bring the argument into the open so that the utilities still using 480-volt potential transformers could reconsider the matter and thus make standardization among all companies easier. R. J. Hoffman, G-E, O. K. Coleman, Duncan and Dana Johnson, Sangamo, contributed to the meeting with a discussion of new developments in the metering field.

CRESCENT

A B C ARMORED CABLE

Has These Improved Features Which Make Installation

EASIER—QUICKER—SAFER

Bond Strip Under Armor

Permanently low armor resistance **is provided in sizes No. 14 and 12 AWG by use of a flattened, bonding wire which is in contact with the under side of each convolution.**

Prefabricated Break Lines

The Cut Mark (at 1½" intervals) shows the location of a prefabricated breaking line inside the armor. Only a few strokes of a file or saw guided by the Cut Mark are required to cut through one outer ridge, and a bend by hand severs the armor. This results in a clean separation with no sharp edge—a safer, easier and faster job. The prefabricated breaking lines are so designed that there is *no reduction* in tensile strength, bending quality, crushing resistance and electrical conductivity of armor.

FILE OR SAW

BREAK

PULL OUT PAPER

INSERT BUSHING

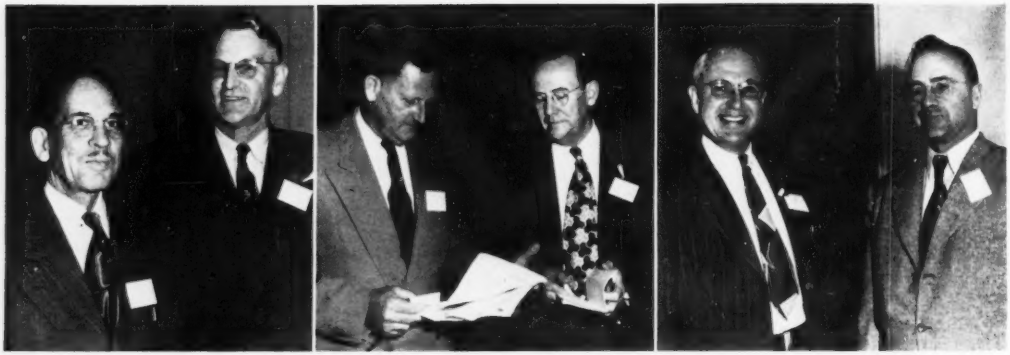
In the last 20 years alone, over SIX BILLION FEET of Armored Cable have been produced by the industry. Armored Cable provides the only general purpose, factory-assembled and tested, metal protected wiring system.

CRESCENT
WIRE & CABLE

CRESCENT INSULATED WIRE & CABLE CO.

TRENTON, N. J.

OVER 60 YEARS EXPERIENCE



Tubbs Middleton Hunt Smith Gielow Foster

Safety Committee
E. C. Hunt, chairman

The safety committee, under the chairmanship of E. C. Hunt, held a section meeting primarily for the purpose of receiving reports from the various sponsors who have been engaged in the preparation of standard rules and regulations. These are divided into six parts: general, traffic, transmission and distribution, switching stations, hydro and steam stations and first aid.

The material on traffic and first aid was completed and submitted to the members of the committee for final passage. Hereafter, additional material prepared by the sponsors will be submitted by mail to the committee. The intent is to encourage review of details and prepare comments to minimize delay in the preparation of the rules and regulations, and to bring about a final form for submission to the representative group of the Operating Economics Section. This not only will accomplish the committee objective but also will allow time for other preparations before the Operating Economics Section. For example, the traffic section would be submitted to the automotive group, etc. After the Division of Industrial Safety has submitted to industry the General Industry Safety Orders, the committee will have completed the general section of its rules and regulations.

It is hoped to accomplish more by holding a one-day meeting, one day in advance of any forthcoming conference or convention. This is for the purpose of coordinating the work and will allow members of the accident prevention committee to participate in other sections.

Preizner reported on a subcommittee activity continued in the state of Arizona. The objective of this subcommittee is to bring about closer coordination in accident prevention work not only in that state, but also to present a closer tie-in with the activities in California and Nevada.

A dramatic presentation prepared by W. A. Cyr, of ELECTRICAL WEST, entitled *Who Killed Bill Evans* was presented before a general session on behalf of the safety committee (see page 93).

It is the objective of the accident prevention committee to put emphasis on expectation, preparation and presentation, to inculcate in the minds of all concerned individual responsibility.

Steam Generation Group
W. A. Zitlau, sponsor

Discussion of acceptance tests at PG and E's station P, by R. A. Fulton, of that company brought out the importance of such tests in bringing to light and correcting any defects in equipment or design. Tests at station P indicated lack of an induced-draft fan; over capacity of condensing water pumps, and an error in installing CO^2 fire protection equipment. Importance of routine tests, taken at frequent intervals, also was stressed to show up any deviation of equipment from original condition. H. C. Bennett, So. Calif. Ed., basing his remarks on the Long Beach steam plant, said the first test should be a capacity test on prime mover and all related equipment. Second test should be the efficiency of equipment and the third test, reliability of equipment considering its importance to over-all station reliability. The speaker gave a long list of things to be observed in making tests.

Otto Hedrick of Pasadena and Glendale discussed practice in testing units at Pasadena and Glendale municipal steam plants. The Pasadena plant with three units and a fourth now being installed, had acceptance tests run over a period of years with practically no routine tests. Glendale acceptance tests were made using A.S.M.E. standards as a guide. Routine tests consist largely of heat transfer on feed water heaters for thermal differences, circulating water tests on the condenser to ascertain tube fouling, turbine tests with fixed throttle opening, pressure and temperature tests with readings taken on stages to determine fouling of blading, and boiler feed pump tests.

Anti-friction bearings in power plant auxiliaries was discussed by M. L. Carter, city of Glendale. Anti-friction bearings used extensively in plant auxiliaries are expected to give continuous service and trouble-free operation of prime importance, he said. Bearings were also discussed by J. L. Longley, Allis-Chalmers.

M. V. Long, Shell Development Co., designer of the "Probolog," described this new development. Probolog is a portable electronic instrument weighing about 50 lb. designed for non-destructive testing of heat exchanger tubing with a graphical record representing condition of the tube. Applied to many industries it has proved economically worthy. L. Baskette, So. Calif. Ed., related his company's experience with the Probolog. The instrument has been found applicable to testing large condenser tubes.

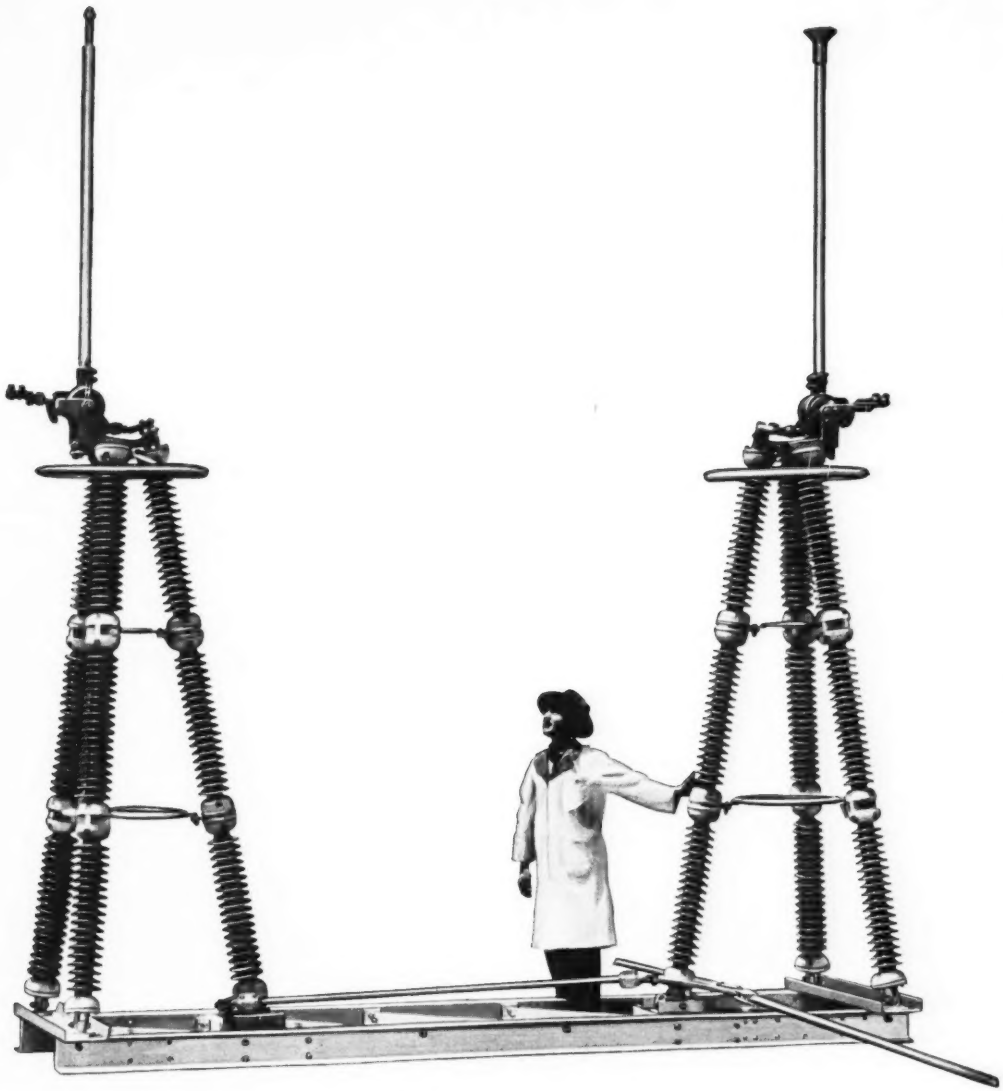
Reheat, unit construction and header type of construction were subject matter for a symposium by R. H. Tilghman, B & W; Alf Hansen, G-E; H. E. Thielscher, Combustion Engineering, and D. R. Jenkins, Westinghouse. Papers showed that the reheat cycle will give station heat rates about 5% lower than non-reheat installations. Investment is a little higher with reheat, about 5%, but fuel savings of 5% to 6% are realized. V. J. Estcourt, PG and E, said he felt that a trend away from reheat and toward higher-temperature units had caused considerable loss to the industry. He stressed the

(Continued on Page 115)

Cole Electric Co.

8439 Stellar Drive Culver City, Calif.

TExas 0-4701



AIR BREAK DISCONNECTING SWITCH
230,000 Volts—1200 Amperes—Type MV
Vertical Break—Three Pole, Single Throw
Group Operated
(One pole shown)

Your choice of 1, 2, 3, or 4-lamp

Fluorescent Lighting Fixtures in the complete CROUSE-HINDS line . . . . designed to meet your requirements

EASY INSTALLATION

Crouse-Hinds Explosion-Proof Fluorescent Lighting Fixture CONDULET* has a novel hinge connection between the lamp receptacle housing and the ballast housing that makes it unnecessary to raise and attach both ends of the fixture at the same time. With the tubes hanging straight down, the ballast end is connected to the supporting CONDULET. Then the relamping end is raised and attached, bringing the tubes to a horizontal position.

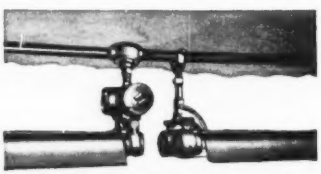
EASY MAINTENANCE

Relamping is a quick and easy one-man job. No special tools are required. Moving a link in the supporting stem assembly permits one end of the fixture to be lowered so that the lamp can be withdrawn. After relamping, simply lifting the lowered end automatically locks the fixture in its normal position. Saves time and money on maintenance.

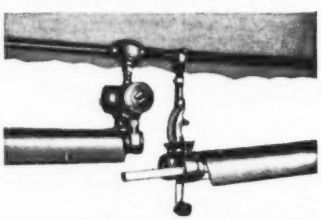
QUALITY CONSTRUCTION

The ballast and lamp receptacle housings are of cast aluminum with unobstructed threaded covers to allow easy access to the interior. Each lamp is housed in an individual heat-resisting glass tube. The ballast housing is entirely exposed, resulting in a low operating temperature. The durable white enameled sheet steel reflectors are securely attached by spring clips. No tools are required to put them on or take them off after the fixture has been hung.

Write for full details on this modern Explosion-Proof Fluorescent Lighting Fixture CONDULET.



Type EVF Explosion-Proof Two-Lamp Fluorescent Lighting Fixture CONDULETS installed in Line Close Together



End of One Fixture Lowered for Relamping, One Cover Removed and Lamp Partly Withdrawn

Takes standard 40-watt, 48-inch lamps.

*CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City
Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle
St. Louis — Washington. *Resident Representatives:* Albany — Atlanta — Baltimore — Charlotte — New Orleans — Richmond, Va.
CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS
FLOODLIGHTS
TRAFFIC SIGNALS
AIRPORT LIGHTING

"Give us the tools..."

YOUR ONLY CHANCE of Getting Ahead

Where is the "brave new world" so glowingly promised us by the politicians during and after the war? We were told then that postwar America would live 50% better than it had before. Why has that promise faded out? Why are men today discouraged and frustrated?

We have not yet made good 1944's promises because the *American worker turns out no more in an hour now than he did in 1941.* We are getting more total production in our country – but only because we have more people working. Not because each one of us is producing more. American industry's ability to turn out more and more goods – with less of each worker's time and effort – has been stymied for eight long years.

Progress has been blocked because in some cases workers have not been willing to work as hard as they did before the war. In other cases unions restrict the use of labor-saving machines and methods. In some places obsolete building codes and ordinances prevent advances. In still other cases progress has been blocked by collusive practices between unions and manufacturers or operators.

But the biggest block to progress is the fact that our industry in the United States has been unable to provide our workers with all the new tools and equipment that they need.

Increasing productivity – that is, each one of us turning out more in each hour of work – is the key to higher living standards. Productivity depends directly upon the kind of tools workers use. His tools, more than anything else, determine how much a worker can turn out; and what his paycheck will buy depends in large part on what he turns out–not on how long or how hard he works.

Look what happened in our country in the forty years from 1900 to 1940. Productivity of the United States *more than doubled.* It doubled because:

Business investment in capital equipment gave workers new tools – tools that had three and one-half times as much power –

So – Americans' living standard rose almost 50% while the average work week was dropping from 61 to 43 hours.

Industry did continue to raise its output per man hour, even in the depressed 1930's. But it did it because, with unemployment widespread, companies used only their most efficient equipment. *Actually the great depression saw industry fall far behind in the job of providing workers with new tools.*

Then came World War II. Few new tools for peacetime industry were produced. *As a result of depression and war, the U.S. fell behind in needed investment in new industrial facilities by more than $100 billion.*

Since the war business has spent almost $60 billion for new plants and equipment –

But the greater part of that money went to *expand* production to take care of the needs of our bigger population, and to *replace* plants and equipment that were worn out and ready to be junked at the end of the war.

continued on next page

Only a small fraction of the $60 billion went to ***modernize equipment*** – the equipment that increases efficiency and improves productivity of the individual worker.

Right now industry is desperately trying to do the job of increasing efficiency of machines so that each worker can turn out more.

McGraw-Hill's national survey of Business' Needs for New Plants and Equipment shows that manufacturers plan right now to spend in the 5 years ahead three-quarters of their capital funds to replace and modernize facilities. The biggest part of the more than $55 billion industry plans to spend on its plants and equipment will go directly to improve efficiency of the individual.

If industry can carry through its plans – and expand them as it would like to and as it must do – the U. S. can catch up on its depression-war-time lag in progress within a few short years.

If American industry is allowed to earn the money to buy the equipment, it can raise the American standard of living 50% in our generation – in the next 25 years. No other nation can promise its people that much – and deliver on the promise.

But the promise can only be fulfilled by American industry. Wherever you turn, industry has dramatic new ways of doing things. Using oxygen by the ton, steel makers are increasing production from blast furnaces by 20%. New high-speed machine tools are doing three times the work of 1940 tools. A new coal-mining machine will multiply a miner's daily output 10 times. Diesel locomotives do the work of three steam locomotives on many jobs.

New products – and larger production of standard products – are already making their impact on American life. Two million Americans will get new television sets this year. Automatic washing machines, electric dishwashers, and home freezers are easing the daily tasks of thousands of housewives. Millions of homes that did not have them before the war now have telephones, automatic heat and refrigerators. Frozen foods, nylon clothing – these and many other things coming along now – will shape the *real* new world for Americans.

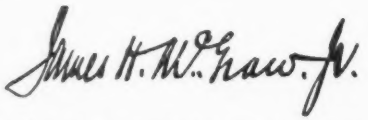
But industry can provide them only if it can keep on investing at least $15 billion a year now – and more in future years – in new plants and equipment.

Today Washington is taking a course which, if pursued, will make that investment by industry impossible. Government spending now strains our resources to the limit, and more multi-billion dollar spending proposals are being piled on. *But government spending cannot improve American living standards.* It never has, and it never will. Increasing government spending *now* will only block progress, because the government proposes to pay for its plans by taxing away the profits industry is using, and must continue to use, to improve and expand its plants and equipment – our only hope for greater worker productivity and higher living standards.

Better living can only be paid for with more production. And we can only get more production by increasing productivity – by each one of us producing more for each hour of work.

The first thing is to get the production – in peace and in war – for better living – for security. Industry is planning to provide it – and is using $13 billion of its profits this year to improve and expand its facilities.

The only sensible, the only safe national policy is to make it possible for American industry to do its job – not to terrorize private industry with proposals of ruinous taxation and paralyzing controls and threats of nationalization. For American industry is not a thing apart from the American people any more than is government. American industry is the lifeblood of the American people and whatever makes industry do its work better contributes more to the common welfare than a bureaucratic government can ever hope to do.

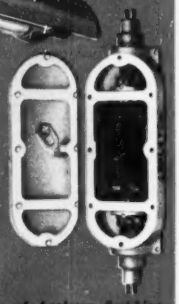


President, McGraw-Hill Publishing Company, Inc.

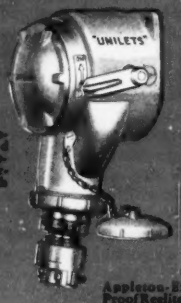
PERMANENT DISASTER PREVENTION!

Appleton offers numerous types and combinations of dependable Explosion-Proof Lighting Fixtures in the exact size for your specific requirements.

Safety and service features of the Appleton Type EFU Explosion-Proof Fluorescent Lighting Fixtures make them foremost in design of fluorescent lighting for hazardous locations.



The Appleton Seal-Line Switch Unilet is a combination switch housing and sealing unit. Provides complete explosion-proof performance without the need of additional sealing fittings.



View of Appleton Seal-Line Switch Unilet with cover removed, showing switch chamber isolated from splicing chambers in approved explosion-proof method.

Type FSQX Explosion-Proof and Dust-Tight Receptacle with interlocking safety switch and type FP plug.

Appleton Explosion-Proof Reelites automatically take up and pay out conductor cable to machinery used in hazardous locations.

APPLETON

EXPLOSION-PROOF EQUIPMENT

For Hazardous Locations

Dangers to life and property that lurk in the wiring systems of hazardous locations are permanently eliminated when Appleton Explosion-Proof Equipment is used.

These rugged malleable iron conduit fittings and lighting fixtures confine treacherous arcs that cause fires and explosions in chemical plants, oil refineries, hospital surgeries—all locations where explosive or flamable vapors, dusts or gases are present.

Appleton Explosion-Proof Fittings are strong and unbreakable, roomy, truly threaded and machined, easy to install. And there is an Appleton Explosion-Proof Fitting exactly suited to every explosion-proof requirement.

Any wiring job—explosion-proof or otherwise—is a better wiring job when Appleton Electrical Fittings are used. So save time and build better. Order all your wiring requirements from one dependable source—the 15,000-Item Appleton Line. Write for catalog information.

SOLD THROUGH ELECTRICAL WHOLESALERS

APPLETON ELECTRIC COMPANY

1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

LOS ANGELES 12, 100 N. Santa Fe Ave.

SAN FRANCISCO 1, 655 Minna Street

SEATTLE 9, 115 Ray Street

DENVER 2, 1921 Blake Street

APPLETON ELECTRIC PRODUCTS

UL LISTED UNDERWRITERS' LABORATORIES INC. RE-EXAMINATION SERVICE

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

CARBON BRUSHES
AT YOUR
Fingertips
WITH
REFERENCE BOOK
No. 19-E

Give Your Motors A Chance
EQUIP THEM WITH
OHIO
MOTOR
BRUSHES

ORDER AN ADVANCE STOCK AND INSTALL AT A MOMENT'S NOTICE

In Catalog 19-E, brushes are listed alphabetically by motor and equipment manufacturers name. At least 15,000 styles of motors are listed. It's a plain "dollars and sense" policy to order an adequate stock of emergency brushes, a few sets of each, and preserve economy in your motor maintenance.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St., Los Angeles, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

point that individual cases should be studied, all factors considered rather than to rely upon a current trend.

C. D. Lawton, Allis-Chalmers, discussed trends in power plant auxiliary motor drives. Trend toward outdoor locations of many auxiliaries has developed motors in larger ratings that can operate in any climate. Availability of new type motors is one of the factors which has made possible the modern power station, he said.

Lack of time prevented the group from taking up the subject of vibration and likewise forestalled a scheduled round-table discussion. Many of the subjects will be carried over to future meetings.

Substation Group
A. A. Straub, sponsor

The increasing difficulty of successfully restoring a distribution circuit after a service outage due to increase in the amount of automatically controlled motor load, was a principal topic of discussion in the meeting of the substation group. W. H. Peterson, PG and E; J. F. Sinnott, San Diego G&E, and C. R. Canady, So. Calif. Ed., led this discussion. Restoration current can be above normal relay settings and cause the feeder to trip out immediately, further extending the outage. Methods used to re-establish service under these conditions have been: blocking protective relays, which has the disadvantage that the breaker may be closed in on a fault, and feeder sectionalizing, which is not completely satisfactory because of the extended time for complete restoration of service to healthy circuits. Use of reclosers and fuses was proposed to permit higher settings for overcurrent relays. The recent availability of overcurrent relays with extreme inverse characteristics approaching that of fuses will do much to simplify the problem.

Use of low-pressure carbon dioxide fire protective equipment for substations was discussed by A. K. Wayman, Cardox Western Inc. Carbon dioxide is stored in tanks at pressures of 300 psi, and 0 F. He stated that the low-pressure type system permits the ready use of constant discharge nozzles. There is no sooting or corrosion when carbon dioxide is used, he said.

E. B. Hanson, G-E, showed that lightning protection is worthy of more serious consideration here in the West. The growing concept is to place increasing dependence on protection by lightning arresters against both lightning and switching surge overvoltages, and to base insulation requirements of apparatus on the arrester protection level. There is a trend, particularly in the higher voltage transmission, to consider reduced insulation class where grounded neutral ratings of arresters can be applied.

Supervisory control and operating problems were discussed by W. F. Clare, So. Calif. Ed., and R. H. Hartley, Westinghouse. Supervisory control equipment should be so located that it is easy to maintain, visible to the operator, and in harmony with surrounding equipment and should be readily extendible, they said. It was suggested that the dispatcher's office and outlying station supervisory equipment be checked side by side before final installation to minimize field checking and travel time.

A joint meeting with the communications group on microwaves will be found in the report of the communications group.

Transmission and Distribution
W. R. Gielow, sponsor

Helicopter reconnaissance for major transmission line location was presented by Jordan Lummis, So. Calif. Ed. This is a new approach to the difficult problem of selecting the best route for a new line. It is also a new use of the helicopter, already being used by several utilities for patrol work. The helicopter permits a detailed examination of terrain and ground conditions with the result that the best route from the standpoint of cost and accessibility may be chosen. The helicopter is of further use to ground survey crews by dropping maps, bags of lime, in case of bare ground, or flags where there is brush or trees, to mark angle points.

Application of series capacitors to distribution feeders was discussed by T. A. Bettersworth, PG and E. He described one installation that had solved the problem of fluctuating feeder voltage due to large sawmill motors. He pointed out that on circuits of low X/R ratio, series capacitors can effectively reduce voltage fluctuations caused by starting currents. Series capacitors are not effective in reducing fluctuations caused by periodic loads that do not exceed rated load, however.

Through the courtesy of E. H. Lewis, Western Insulated Wire Co., a motion picture was shown telling the story of neoprene. A round-table discussion was led by H. E. Jung, So. Calif. Ed., on copper to aluminum connections, conductor splices and rust-resistant pole line hardware. On the first two subjects it was agreed that one of the major factors governing satisfactory operation of a particular fitting is the care used in cleaning the conductor and in installing the fitting. In connection with rust resist-

ant hardware, it was pointed out that many of the so-called corrosion-resistant metals and stainless steels break down comparatively fast when used under conditions where continuously exposed to moisture.

Economics of system dispatching was the subject of discussion by E. M. Foster, San Diego G&E. He told of studies his company has made and the procedures set up to coordinate the dispatchers work of system operation with the work schedules of line crews, station construction men and maintenance men. Coordination and simplifying of procedure has done much to reduce outage time.

A. A. Kroneberg, So. Calif. Ed., gave an over-all picture of system voltage control. He showed how the Edison system had been reduced to a simple line equivalent circuit for purposes of applying proper type and location of regulating equipment.

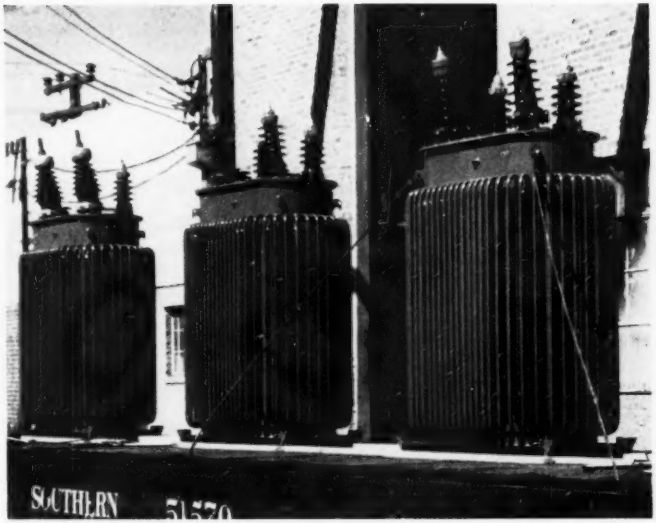
A round-table discussion on design of wood pole structures led by E. M. Wright, PG and E, wound up the last meeting. Problems and troubles encountered and remedial measures were discussed. One of the principal sources of trouble is the point of transfer of stress from metal to wood, such as at guy attachments, crossarms, through bolts and steel pins. Consensus indicated that methods now used and available fittings do not wholly provide a satisfactory answer to many of the difficulties encountered.

Annual Meeting

Victor W. Hartley, managing director, pointed to accomplishments of committees, notably advertising, meter, home economics, farm electrification, code and ordinance, LP Gas, adequate wiring and safety. These activities have been reported in ELECTRICAL WEST through the PCEA Panorama.

Membership is the strongest in the association's history, Hartley stated, with 3,142 total, 4% over last year and 45% over five years ago. He listed 193 company members including 14 utilities, 128 manufacturers and manufacturers agents, 22 wholesalers and distributors, 23 contractors and dealers and 11 others. In addition there were 2,395 individual memberships, 59 associate memberships, he said.

I. W. Borda, Okonite Co., San Francisco, was elected president. Directors elected: H. H. Courtright, PG and E, Fresno; C. C. Ernst, Calif. Elec. Power, Riverside; C. W. Goodwin Jr., G-E Supply, San Francisco; W. C. Mullendore, So. Calif. Ed., Los Angeles; Harold Quinton, So. Calif. Ed., Los Angeles; D. D. Smalley, PG and E, San Francisco; G. C. Tenney, McGraw-Hill, San Francisco; F. A. Tracy, Sierra Pacific, Reno.



Voltage correction with optimum regulation and minimum core and copper losses is the function of this battery of transformers built by Gardner Electric. These 833 KVA, single phase transformers, 26,500/46,000 Y volts to 25,200 volt secondary with tap changers were recently delivered to a Midwestern utility on a repeat order. Gardner transformers for every application are always designed for economical operation under actual conditions of service.

Gardner Electric Mfg. Co.
EMERYVILLE 8 CALIFORNIA
Representatives
WEST COAST
MAYDWELL & HARTZELL, INC.
MOUNTAIN STATES
ELECTRICAL SPECIALTY CO.
GARDNER TRANSFORMERS GUARD PROFITS

ELECTRICAL ENGINEERS

Graduates, experienced in design, engineering and economic studies of steam-electric power plants and high voltage substations. Also, engineer experienced in power system relaying and in preparation of specifications for switchboards and switchgear. Please submit resume including personal data, education and experience record to:

Personnel Department

EBASCO SERVICES Incorporated

Two Rector St., New York City 6, N.Y.

THE MONTH IN BRIEF

Redding Turns Down Shasta Contract

Redding, Calif., citizens voted 1,364 to 1,333 to renew the city's power contract with Pacific Gas and Electric Co. through 1955. Alternative was a contract with the USBR for power from Shasta plant, ten miles away. The city council earlier had approved the PG and E contract, three to two, but yielded to public pressure for an election. The bureau offered Redding power at an annual cost in the neighborhood of $183,000. PG and E will charge approximately $213,000, 5% below its present contract and 10% below the company's standard wholesale rate to municipalities. (PUC approved the reduction to allow the company to meet the competitive situation in the area.) Under the present contract, the city's profit on power resales pays about two-thirds of its operating expenses. The bureau contract stipulated the retail rate and prohibited any profit on resale. A strong fight for the PG and E contract was waged by a citizens committee, which raised money for newspaper and radio advertising, and carried on a door-to-door campaign.

Work Resumed at Redondo Plant

Turbine installation was resumed at Southern California Edison's Redondo Beach power plant late last month, following a NLRB hearing on an unfair labor practice charge against the AFL Building and Construction Trades Council, the Carpenters Union and others. Work had been held up since Feb. 1, when 650 AFL workers struck in a jurisdictional dispute with the International Association of Machinists, two of whose members were employed on the job by Westinghouse. NLRB upheld the manufacturer's right to use association members. When the union groups did not comply with the NLRB ruling, the board made a formal complaint and an injunction was issued, resulting in the hearing which closed June 23. Decision from Washington is expected Aug. 1.

Legislature Kills Forced Lease

Attempt to force Pacific Gas and Electric Co. to lease its transmission lines to USBR for distribution of government power was killed by the California legislature. The assembly committee on public utilities and corporations refused to allow the bill to come to vote on the floor. The measure also would have outlawed the company's stand-by service charge to farmers.

New Arizona Company Formed

Central Arizona Light and Power Co. of Phoenix is the sole owner of a new company, Northern Arizona Light & Power, which will operate in the area now served by Arizona Power Co. Under the agreement between the two companies, Arizona Power will sell its facilities with exception of two hydro and one steam plant. Calapco will purchase the 15,000-kw. output of these plants on a long-term contract. Reported purchase price for the system is $4,000,000, and Calapco officials have indicated that some $2,500,000 will be spent annually for the next three years to build up the new company. William P. Reilly of Prescott, president of Arizona Power, will become vice-president and general manager of Northern Arizona Light & Power Co. Headquarters will remain in Prescott.

Ruling on Rate Reductions

Privately owned utilities in Oregon may reduce rates to meet local competition, provided any losses suffered are absorbed by the companies and are not passed on to customers in other areas through increased rates. This, in effect, is the ruling of Attorney General George Neuner in an opinion handed down in connection with Pacific Power & Light Co.'s application for new rate schedules for The Dalles. The proposed rates are approximately the same as those charged by the Wasco County PUD, which competes with PP&L in The Dalles. (See story, p. 120.)

Purchase Offer Expected

Puget Sound Power & Light Co. may receive a purchase offer during July from eight PUDs. Purchase price is expected to be based upon $18 a share for common stock. According to reports, the PUDs are not agreed on what properties to buy. Chelan, Skagit, Kitsap and Thurston are said to favor purchasing the entire system, including generating plants; Snohomish, Kittitas, Jefferson and Whatcom reportedly want only local distribution systems.

DST May End in Portland

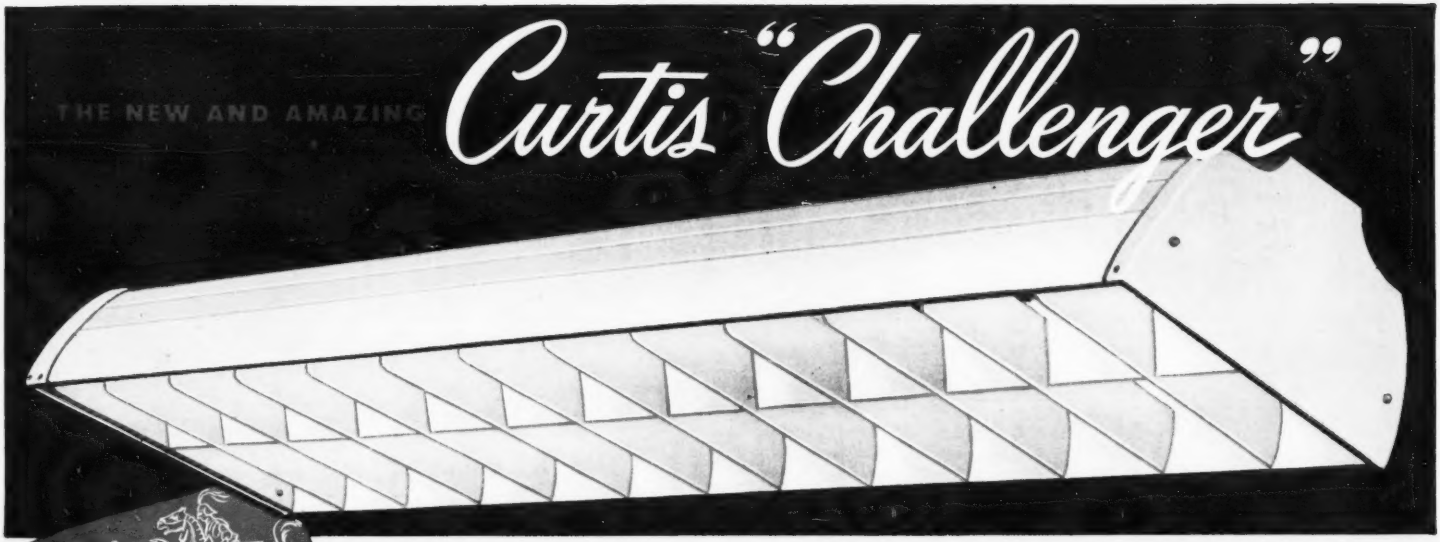
Portland will return to standard time July 15, unless daylight saving advocates secure some 16,000 signatures to a referendum petition, which would postpone the change at least until the November 1950 election. Power company officials report that effect of daylight saving on power consumption in Oregon has been negligible, since most of the area served by the Northwest Power Pool is on standard time. Such areas as are on DST coincide with Mountain time, which prevails in the eastern parts of the pool. In California, supporters of an initiative constitutional amendment calling for DST every summer have permission to circulate petitions.

Rainmaking Economically Sound

Rainmaking by the cloud-seeding method has been proved economically sound, according to Irving P. Krick, meteorological consultant of Pasadena. Results of a privately sponsored and little publicized series of cloud-seeding flights in Arizona during the summer of 1948 and last winter have given conclusive evidence that water storage can be increased by these techniques, he says. Value of the water thus produced in comparison with cost was roughly in a ratio of six to one. Water allotments to the Salt River Valley Water Users were increased from ¾ of an acre-foot in December 1948 to 2½ acre-feet from April 1949.

THE NEW AND AMAZING

Curtis "Challenger"



IT Challenges

...ALL PREVIOUS STANDARDS FOR QUALITY... EFFICIENCY... INSTALLATION COST ... MAINTENANCE COST... VALUE AND PRICE!

Now with the "Challenger" you can sell Curtis Quality... **at a new low price**... the very same quality, engineering and workmanship that has set the standards for the lighting industry for over a half century. Now with the "Challenger" you can sell Curtis Design and Efficiency... comparable to the best in the lighting industry at a price that will amaze your customer... and still bring you an attractive profit.

FOR FULL DETAILS *Send Coupon Today!*

SEND COUPON NOW!

Curtis Lighting, Inc.
6135 W. 65th Street, Chicago 38, Illinois

Gentlemen: Please send me FULL DETAILS and PRICES on the new "CURTIS CHALLENGER."

COMPANY NAME_____

ADDRESS_____

CITY & STATE_____

INDIVIDUAL'S NAME_____

"FROM MOLTEN METAL
To Finished Product"

Every Step Under Wagner Control

You get the finest "to work with" when you use Wagner Electrical Fittings. Tough, accurately cast, precision threaded, you're sure of uniform quality when they're Wagner's.

Every step from pattern to flask, to the pouring of molten iron, through machining, plating, sorting and inspecting are Wagner controlled.

Years of specialization, and experience in the manufacture of Malleable Electrical Fittings are a guarantee of dependability. Specify Wagner Fittings and be sure of easier, smoother installations. Nationally distributed through leading wholesalers.

WAGNER MALLEABLE PRODUCTS CO., 222 W. Adams Street, Chicago 6, Illinois. Foundry and plant, Decatur 60, Illinois.

Write today for illustrated Catalog 483. You'll find it a handy reference.

WAGNER
Malleable Fittings

Western Representatives: Murphy-Hain Company, 720 E. Second St., Los Angeles 12, Calif. Fred E. Stabible & Sons, 2036 Arapahoe St., Denver 2, Colo. Hodges & Glomb, 1204 Folsom St., San Francisco 3, Calif. Northwestern Agencies, 1130 First Ave., S., Seattle 4, Wash.

THIS MONTH'S NEWS

Purchase Agreement Reported at Seattle

An agreement has been reached between Puget Sound Power & Light Co. and the Snohomish County PUD for sale of the power company's distribution facilities in the county and on Camano Island to the district. Price exceeds 16 million dollars.

A condition of the joint agreement was that the PUD immediately dismiss its pending condemnation suit against the company. Such a step is also a prerequisite to the carrying on of negotiations for an over-all acquisition of the company's holdings by other PUDs, acting together, according to a PUD spokesman.

Frank McLaughlin, president of the power company, stated the price to be paid was 16 million dollars, plus accounts receivable and net additions from January to the closing date. He estimated about 12%, or $3,241,000 of the company's 1948 total gross revenue, and around 15%, or 38,358, of the total electric customers, were involved in the transaction.

Al Murray, PUD manager, Everett, said the commissions's vote for the purchase was two to one. In the event that it appears an over-all acquisition by all PUDs working together cannot be consummated by Oct. 31 the company said, it agrees to sell the properties to the Snohomish PUD by Oct. 1.

McLaughlin described the purchase price as "fair," and said no "power pool" facilities were included in the property to be sold. The district will obtain its power from the Bonneville Administration under a 20-year contract dated last June, he said.

Emphasizing power shortage as a principal problem, before Seattle's city government, Mayor William F. Devin recently declared the city's negotiations with Puget Sound Power & Light Co. should be "carried on as rapidly as possible."

Insisting that generating facilities should be included in any purchase, Devin expressed confidence that "a proper and equitable plan" can be worked out with the city of Tacoma and the PUDs as to the acquisition of these facilities.

The mayor's statements were made in his annual message read before the city council and the various boards and commissions and heads of departments.

A NEW service . . .

Electrical Specialty Co. is now distributing and stocking

SAFE-T-MIKE CAPACITORS

at a new low price

Safe-T-Mike Capacitors are:

1. SAFE—They are safe to use in any motor designed for intermittent service not exceeding 3 second starts or 20 starts per hour.
2. DEPENDABLE—Fabricated with the finest material and workmanship to be found in the industry today.
3. ECONOMICAL — Competitively priced so as to bring you the best for less.

Give us an opportunity to discuss with you our new low list and motor repair shops' discounts.

ELECTRICAL SPECIALTY CO.

SAN FRANCISCO, 316 Eleventh St. — LOS ANGELES, 418 E. Third St.
SEATTLE, 2406 First Ave. So. — PORTLAND, 325 N.W. 6th Ave.
DENVER, 1015 Twenty-first St.

MOTORS, GENERATORS, TRANSFORMERS

1 — 1500 H.P.
Bought and Sold
New and Rebuilt

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

For Sale. Electric utility in Western town, 1500 population. Growing business, good climate. Box 254, Electrical West, 68 Post St., San Francisco 4, Calif.

Graduate registered electrical engineer desires position with management opportunity with public power system. Eight years transmission, distribution experience. Write Box 253, Electrical West, 68 Post St., San Francisco 4, Calif.

THE 17th ANNUAL MANUFACTURERS' DIRECTORY published April 1949 by Electrical West, is a handy guide listing manufacturers of electrical equipment, and their principal Western sales outlets.

COURT TEST ASKED FOR NEW POWER LAW

Two eastern Washington cities—Yakima and Walla Walla—have asked the state attorney general to make a court test of the state's new power law as it applies to PUDs.

A resolution passed by the Yakima City Commission asks that the constitutionality of the law be tested before a $150,000 appropriation provided in the measure is spent. A provision of the law would permit two or more PUDs to buy and operate entire power systems.

Both Yakima and Walla Walla are served by the Pacific Power & Light Co. and neither has an active PUD. Under the law, PUDs of adjacent counties could buy and operate the Yakima and Walla Walla systems.

Constitutionality of the law has been questioned on grounds that it covers more than one subject.

Association Terms Request Interference with PUDs

The Washington Public Utility Commissioners' Assn., at its annual convention in Pullman, adopted resolutions criticizing the Yakima and Walla Walla city commissions and the Tacoma utilities commissioner for alleged "interference with PUD efforts in trying to acquire private utility property."

The commissions drew the association's criticism for asking the state attorney general to seek a court test of the constitutionality of the state's new power law which grants PUDs new authority in acquiring private utility systems.

C. A. Erdahl, Tacoma utilities commissioner, was criticized for allegedly helping institute a condemnation suit of Puget Sound Power & Light Co. properties after the Thurston and Kitsap County PUDs had negotiated for them. He is considering withdrawal from conferences with the PUDs and Seattle City Light which sought joint action for acquisition of the Puget Power properties.

PUD Takes Over Power Operations at Newport

Pend Oreille County PUD has taken over operation of Mountain States Power Co. facilities at Newport, Wash., after completing a $326,896 purchase.

The purchase gives the PUD control of all service in the Newport and Metaline areas. Washington Water Power Co. still is operating in the Calispel Valley but the PUD has a condemnation suit pending against that property.

The PUD sold an $875,000 bond issue to John Nuveen & Co. of Chicago to finance the purchase, retire previous loans and provide working capital.

Executive Raps Exaggerated Statements on Power Needs

Normal power reserves will be reestablished by year's end everywhere in the United States except in the Pacific Northwest and Tennessee Valley Authority areas—"the two strongholds of federal public power," Harold Quinton, Southern California Edison executive vice-president, declared last month in a talk before the Society of Security Analysts in San Francisco.

Quinton blamed power shortages directly on the war and the War Production Board. "For four years," he pointed out, "the industry could not place an order for heavy electrical equipment and the WPB even canceled some orders that were placed before the war."

Neither drought nor increased demand in the postwar period would have resulted in power shortages except for the added handicap of the four-year moratorium on normal annual expansion of the industry, he stated.

Although these shortages were less severe than those recorded in almost every other commodity, they have become the basis for many "exaggerated" statements of future power requirements, he said.

The healthy average annual growth figure of about 5% annually from 1920 to 1940 and the strong probability that the 1940-60 period will show a similar pattern is ignored completely by proponents of "extravagant, wasteful expansion and federal ownership of the power industry," he said.

The real interest of public power boosters, he declared, is not in adequate electric power but in their own personal positions in a hoped-for socialistic state.

"The biggest error of American businessmen and American financial leaders today lies in their failure to point out the basic fact that the entire business enterprise of this nation is seriously threatened," he warned. "Just how good is any property in a socialized state?" Even worse, he continued, is their acceptance, acquiescence and even their publicly expressed concurrence in the propaganda that business is sound.

"Business is not sound," he asserted. "It was never more basically unsound, and it is the clear duty of business and financial leaders who are entrusted with the management of the great properties of this nation to warn the owners of those properties of that clear fact."

TRI-VAR
finest quality
INSULATING VARNISH
provides

LONG LIFE
HIGH DIELECTRIC
THOROUGH BONDING
MAXIMUM COVERAGE
EASY HANDLING

There is a Tri-Var Varnish for Every Electrical Purpose!

Air-Dry • Baking
Amber—Black—Clear
Sealers and Enamels in Black, Red, and Grey . . . for finishing, too!
ASK FOR A TEST SAMPLE

TRI-STATE
SUPPLY CORPORATIONS
LOS ANGELES 13 • 544 South San Pedro St MUtual 2354
SAN FRANCISCO 7 • 554 Bryant Street Ekbrook 7-8890
SEATTLE 4 • 318 Occidental Avenue Main 4161

COMPANY GETS ADDITIONAL BPA CONNECTIONS

Puget Sound Power & Light Co.'s request for two additional interconnections with Bonneville for emergency use was approved by FPC last month. The order authorizes the company to maintain the additional connections, with Olympia and Snohomish substations, without becoming subject to FPC regulation.

At the same time, the commission turned down the company's request for permission to make such further interconnections as might alleviate the power shortage in the Pacific Northwest.

The commission in January 1947 authorized Puget Sound Power to maintain wartime interconnections with other Northwest utilities on an emergency basis. At the time, FPC stated that the entire area faced a power shortage, a finding challenged by Montana and Idaho utilities. FPC then pointed out that power supply deficiencies in the state of Washington had created the area shortage.

In making its request for additional connections last May, Puget Power stated that the power shortage has become "progressively worse."

Electrical Work Ordinance Revises City Procedure

The Longview, Wash., city council has adopted an electrical work ordinance which revises and amends ordinances previously in effect.

The new law stipulates that electrical installations must conform to the National Electric Code and meet inspection and construction requirements by the city. It provides that electrical contractors pay a $100 fee to the city for a license the first year they are in business and $25 yearly thereafter.

Property owners must obtain a permit, if doing their own work, with fees varying with the number of outlets and the amperage and number of circuits installed. Permits also are required of contractors.

The building inspector is given the right to demand that a contractor make a certain installation, if an owner does not make one that conforms to code and inspection requirements of the city. Installation of electric fences is banned, although those already installed may remain so long as they are kept in good order.

● Imperial Irrigation District, El Centro, Calif., has been authorized by voters in the district to sell a $12,500,000 revenue bond issue to finance expansion of its power system. A hydroelectric plant is planned at Pilot Nob on the All-American Canal, near the point where water is diverted into Mexico. This construction is contingent upon the federal government's release of the site. Failing that approval, the district would build another unit at its recently expanded steam generating plant at El Centro and a small hydro plant addition at the district's plants at Drops 3 and 4.

Hearing Held in Oregon on Electric Rate Reduction

Decision on petition of Pacific Power & Light Co. to reduce its power rates at The Dalles, Ore., to meet competition of a new PUD operating in the area, hinges on whether the proposed reduction would burden consumers in other areas.

This was explained by E. L. Graham, assistant state attorney general, who served as examiner for the Oregon Public Service Commission at a hearing on the petition held at The Dalles.

PP&L is seeking permission to reduce its rates in The Dalles area to meet those charged by the Northern Wasco PUD, which has set up a distributing system duplicating lines of the private utility. Will T. Neill, vice-president of PP&L, testified his company would be forced out of The Dalles unless allowed to meet PUD rates. He denied charges made by representatives of the state grange that the reduced rates would force PP&L customers elsewhere to pay the difference. He said that under the lower rates the company could still meet all direct charges against the local operation and part of the costs allocated for general office overhead.

B. C. Considers New Laws Controlling F Tubes

Introduction of new by-laws to control the disposal of used fluorescent lighting tubes is under consideration at Vancouver, B. C.

The City Council's Social Service Committee has acted on a suggestion from Vancouver, New Westminster and District Trades and Labor Council that school children be warned of dangers in handling discarded fluorescent tubes.

The committee asked Dr. Stewart Murray, medical health officer, and City Solicitor R. S. Baker to consider new by-laws or other action which might lessen the danger.

Dr. Murray told the committee tubes should be broken under water or out of doors to escape dangers of mercury fumes.

COMPANY AND DISTRICT AGREE ON ADJUSTMENT

Pacific Gas and Electric Co. and the Sacramento Municipal Utility District have agreed that $2,285,000 is a fair adjustment due the company on the original purchase price.

An initial payment of $11,632,000 was made when the public utility took over the system Dec. 31, 1946. This figure was approved by the Public Utilities Commission in 1938. The additional amount is for additions and improvements since 1938, less retirements, loss and depreciation.

First adjustment figure set by PG and E engineers was for $4,000,000 while the Sacramento MUD engineers arrived at $1,700,000. The new amount will be submitted to PUC for approval.

Argument on Kings River Development Postponed

FPC has postponed from July 21 to Sept. 22 the oral argument on development of power resources in the Kings River Basin of California. The hearing involves exceptions to an FPC examiner's decision that the public interest would best be served if the power were developed by the federal government. Pacific Gas and Electric and Fresno Irrigation District both propose developments in the river, while the Bureau of Reclamation has a plan for development of the entire Central Valley, including the King's River Basin.

Move in Oregon to Revoke Increased Fees for Wiring

Preliminary petition to invoke the referendum against a measure passed by the Oregon legislature increasing fees paid by electrical contractors and electricians has been filed with the secretary of state at Salem. The measure also requires persons doing their own building to obtain permits (fee $1) for installing electric wiring from the state labor commission.

To get the measure on the ballot at the next election and suspend the act until voters have passed on it, sponsors of the referendum must secure signatures of 15,926 registered voters before July 16.

● The City of Chewelah, Wash., will not renew its power contract with Washington Water Power Co. when it expires in December, according to Mayor A. W. Birge. Bonneville Power Administration authorities have approached the city on a contract to supply electricity to the city for the next five or ten years.

Any way you look at it, a poor wiring system cuts lighting efficiency . . . causes headaches for plant electricians and maintenance men as well as for production workers.

Improving plant lighting and reducing maintenance costs are important functions of General Electric wiring materials. Exciting new products and a full line of old standbys make General Electric the right choice for every wiring requirement.

1. NEW G-E REMOTE CONTROL wiring puts switches for various lights in many convenient locations. Master panel can be located at production head's desk. Banks of switches can also be located at convenient points in the shop for local control. This flexible, new wiring system also permits control of any or all lights from distant locations, such as other offices or a master-control point. The G-E remote control wiring system makes multi-point switching economical and easy to put in.

2. G-E REMOTE CONTROL WIRE—lightweight, with two or three conductors—was specially designed for remote control wiring. This trim-looking wire can be installed either concealed or exposed—makes a neat installation when it's run along wall surfaces. It permits remote control switches to be placed practically anywhere. The use of a low-voltage relay makes this small-size wire practical.

3. AVA POWER CABLE is a natural for bringing in power to a high-level lighting installation like this. And, when you think of power cables, think of General Electric Deltabeston* cables. They'll save you maintenance grief, because they're built to beat ambient and operating heat. They can help you save space, too, because they are designed to carry more current than ordinary cables of the same size.

*Trade-mark Reg. U.S. Pat. Off.

4. TYPE TW WIRE is recommended for installation in raceways. Smooth-finished G-E Type TW can be cut and stripped with little effort—pulls through conduit easily when wiring changes are necessary. Small diameter and long life are features of this G-E thermoplastic wire—use it to help your wiring system stay modern.

5. CONDUIT, of course, should be General Electric "White"—the rigid conduit that's *hot-dip* galvanized for extra protection. High-grade steel—galvanized inside and out, and lacquer-coated—gives you maximum wiring protection with a minimum of maintenance. Remember to specify "G-E White."

Your distributor of General Electric construction materials can supply you with any of these materials, or with any of thousands of other items from the General Electric line. For more information, contact him, or write to Section K17-725, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

GENERAL ELECTRIC

your industry's BIGGEST TRADE SHOW!

Your industry's biggest trade show isn't a once-a-year event. It comes to you with *every single issue* of this magazine. And, because it is scheduled so frequently, it can bring you a continuing series of up-to-the-minute "displays." In these advertising pages, you will find the latest news about products and services that are specially designed to help you do your job better, quicker, and cheaper. To be well-informed about the latest developments in *your* industry . . . and to stay well-informed . . . *read all the ads too.*

McGRAW-HILL PUBLICATIONS

NORTHWEST POWER SUPPLY ASKS FPC AUTHORIZATION

Northwest Power Supply has asked the Federal Power Commission to authorize its proposed $12,775,000 Pelton Power project in the Deschutes River of Oregon (EWEST, February, p. 134, 138).

Interior department is opposed to construction of the dam, according to G. Girard Davidson, assistant secretary of the Interior, who said at Portland that the proposed development would be harmful to fish runs and incompatible with the federal fisheries program for maintaining the $20,000,000 salmon fishing industry on the lower Columbia.

Congressman Walter Norblad of Astoria has asked FPC to transfer the hearing from Washington, D. C., to Portland. Norblad represents a district with large fishing interests.

Northwest Power Supply has filed application with the state hydroelectric commission as well as the federal commission. The state commission, which has the power to license the dam, is expected to act on the petition Aug. 6.

The project is sponsored by three Northwest utilities — Pacific Power & Light, Portland General Electric and Washington Water Power companies.

Merwin Addition Will Double Plant Capacity

First section of penstock for an additional generator at Pacific Power & Light Co.'s Merwin Dam has been installed by Morrison-Knudsen Co. Completion of the installation is expected in December.

The new generator will double peak load capacity at Merwin to 100,000 kw. and will increase yearly output by 131,000,000 kwh. Cost of the work, including a 14-ft. diameter penstock, water wheel installation and foundation work, is estimated at $3,500,000. Room for the generator was provided in original construction of the power house.

Since the bridge used in original construction was washed out in 1933, the contractor had to bridge the Lewis River below the dam before he could get heavy equipment to the power house.

● TWELVE ELECTRICAL ENGINEERING students at Oregon State College have been selected to spend the summer gaining experience in the shops, drafting rooms and on construction jobs of Portland General Electric Co. The students were selected by a joint committee of OSC faculty members and company representatives.

ECONOMICAL

Jeffries Transformers

Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles 11, Calif.

ALL the strength and durability inherent in steel are combined—with definite economies—in Crapo Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of Crapo Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

STEAM GENERATOR GOES ON LINE AT TEMPE PLANT

A 7,500-kw. steam generator has been put on the line by the Salt River Valley Water Users Assn. at its Tempe, Ariz., steam plant. The G-E unit was installed at a cost of $850,000, and is expected to pay for itself in three years.

A big saving will result from cutting the need for purchase of blocks of outside power to augment what the system can generate with hydro, steam and diesel generators.

The new unit is the fourth of its size to be installed at the Tempe plant, but it differs from the others in that it will generate only at 60 cycles. The other units have a reduction gear installation that permits generation of either 25- or 60-cycle power.

Output of the association originally was all 25 cycles, but most of the equipment has been changed to 60 cycles. More than two thirds of its 20,000 power customers now are on 60-cycle electricity.

Bonneville Working on Line to Detroit Dam

Bonneville has started work on a 105-steel-tower transmission line to take power to Detroit Dam in the Willamette Basin project, under construction on the North Santiam River in western Oregon.

About three miles below the Detroit Dam site, army engineers will build the Big Cliff Dam, a regulating dam to control water flow. At this dam, power will be generated on a 24-hour basis, while at Detroit, power generation will be restricted to peak hours.

The Detroit Dam proper will produce a maximum of 100,000 kw. for delivery into the Northwest Power Pool during peak hours. A constant production of 16,000 to 18,000 kw. is anticipated at Big Cliff.

Although the entire Detroit project is not scheduled for completion before June 1953, generation of power will be started not later than 1952, according to Lt. Col. John W. Miles, resident engineer.

Bids Called for Second Step Of McNary Dam Construction

Bids for the second major step in construction of McNary Dam on the Columbia River were called by Col. William Whipple, district engineer, Corps of Engineers, for opening July 19 at Walla Walla, Wash. The contract involves construction of the concrete substructure for two main units of the power house, a station service bay and assembly bay, the initial Oregon shore cofferdam, the main second-step cofferdam and a portion of the Oregon shore abutment. Completion is scheduled by May 1, 1951.

B. C. Electric Lets Contract For Third Unit at Ruskin

Contract has been awarded by B. C. Electric at Vancouver, B. C., for the third 47,000-hp. unit to be installed at the Ruskin plant of the company, according to Thomas Ingledow, vice-president and chief engineer.

Total cost of the project, which is scheduled for completion by October 1950, will be $2,500,000. This will bring the over-all investment at Ruskin to more than $11,000,000 since the station was first opened in 1930.

Northern Construction Co. and J. W. Stewart Ltd. won the general construction contract with a bid of $750,000, Ingledow reported, and work gangs from that firm are now on the site.

Dominion Engineering Co. of Montreal will build and install the turbine for $440,000, Canadian Westinghouse, which supplied the first two generators, will build and install the third one for $640,000.

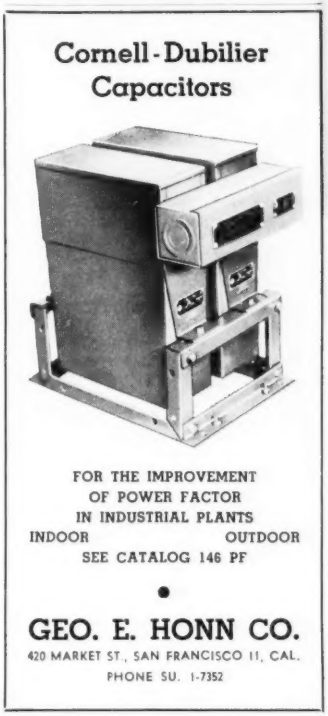
Canadian General Electric will furnish two of the three transformers required for $70,000. The third, the chief engineer said, is already on hand. He added that contracts for the 24-ft. steel penstock, switching and control equipment, and other essential parts of the new unit, would be awarded in the near future.

Plans call for the existing plant to be extended eastward in order to house the new generator which measures 33 ft. from side to side and weighs more than 260 tons.

Also required will be a new tunnel 24 ft. in diameter and approximately 400 ft. long.

● Sacramento Municipal Utility District will erect an office building at 21st and K St. According to James E. McCaffrey, general manager, the commercial, administrative, accounting personnel and sales units will be moved to the new location about Dec. 1. The district's operating, engineering and purchasing offices will remain at 59th and R St. Financing will be by sale of $350,000 par value building notes, maturing in ten equal installments.

● Low Bid of $181,535 for construction of the Grand Coulee-Snohomish east switchyard extension of the 230-kv. steel tower line was submitted to the Bonneville Power Administration by Montgomery Electric Co., Portland.



TUNNEL DRILLING CONTRACT LET BY L. A. DEPARTMENT

An $8,947,520 contract for tunnel drilling on the Los Angeles Department of Water & Power Owens River Gorge development was let to a group of individual contractors composed of Guy F. Atkinson Co., Bressi & Bevanda Constructors Inc., and David A. Gordon and A. Teichert & Son Inc.

Three tunnels will have a combined length of approximately 12 miles, according to Charles P. Garman, chief electrical engineer for the department. Tunnel diameter will be 10 ft. The schedule calls for completion of the 10,400-ft. tunnel No. 2 by October 1950; the 16,400-ft. tunnel No. 3 by November 1950 and the 37,200-ft. tunnel No. 1 by May 1951.

The $42,000,000 hydro project will develop an additional 150,000 hp. Department engineers are utilizing a 2,375-ft. drop from Long Valley Dam to the end of the gorge at Birchim Canyon to spin the turbines in three power plants, each of which will house a 50,000-hp. generator. The power will be carried to Los Angeles over a 250-mile, 230,000-volt transmission line.

Contract Awarded on New Machines for Ross Dam

A $4,445,222 contract for furnishing and installing three 90,000-kw. generators for the Ross Dam power house has been awarded by the Seattle Municipal Board of Public Works to Westinghouse. The order is the largest of its kind ever placed by City Light and is exceeded nationally only by a Grand Coulee award. It will more than double the present output capacity of City Light's Skagit hydroelectric development.

Ross Dam has been heightened to 540 ft. to permit operation of the generators and ultimately will reach 655 ft. Its reservoir contains 1,400,000 acre-ft. of water, extending almost to the Canadian border.

● Skagit County PUD in Washington has been denied use of Lake Cavenaugh by the state Department of Conservation and Development. The district had asked permission to draw 500 cu. ft. per second from Deer Creek, 50 cu. ft. from Lake Creek and to store 100,000 acre-ft. in Lake Cavenaugh.

● City of Tacoma, Wash., has ordered 133 miles of aluminum cable from the Permanente Metals Corp. to rehabilitate its 35-mile power line from the Nisqually power plant to the city, according to J. Frank Ward, superintendent of the Tacoma City Light Division. The cable will be strung over a new right-of-way to connect the Tacoma Tideflats substation with generators at both the La Grande and Alder power plants on the Nisqually. The double-circuit lines will be capable of carrying 114,000 kw., the full capacity of the Nisqually project and about double the capacity of the present lines.

● Baldwin Locomotive Works, Philadelphia, was lowest of three bidders for supplying two 700,000-hp. hydraulic turbines for the power house at Detroit Dam, on the Santiam River in western Oregon, a unit of the Willamette Basin project. Its bid of $1,312,465 was based on turbines of 234,000-ft.-lb. rating. The first of the two turbines is to be delivered May 15, 1952, and the second by Jan. 1, 1953.

● Completion of a third 230-kv. Bonneville transmission line into the Portland area is set for November, in time to help carry the heavy winter load. Contract for clearing the right-of-way for the line from North Bonneville to Troutdale, Ore., has been awarded to M. A. Pithoud, Vancouver, Wash., for $224,098. Construction will follow immediately behind clearing.

● A New working rule agreed upon by electrical contractors and the Electrical Workers Union at Seattle sets a five-mile "free-travel limit" each way outside incorporated cities in the area other than Seattle. Outside the free area, contractors will be required to pay 10c per mile each way, and furnish transportation during working hours from shop to job, job to job or job to shop. In Seattle, the free-travel rule applies only within the city limits, except for an area immediately south.

● Members of a conciliation board have unanimously recommended a journeyman's wage rate of $1.58 an hour for International Brotherhood of Electrical Workers employed by Hudson's Bay Co. in Vancouver. Double pay for nine yearly holidays, a 40-hour week, time-and-a-half for the first four hours and double time after that for overtime is recommended.

● Local 46, International Brotherhood of Electrical Workers, will move into its new headquarters building at Seattle about Aug. 1, according to William Gaunt, business agent. Of reinforced concrete construction, with masonite floors, the building is estimated to cost $375,000.

● Sacramento MUD has completed a 3,000-kva. substation at Sheldon, Calif. The unit was constructed at a cost of $50,000.

FREQUENCY CHANGE PROGRAM WINS COFFIN AWARD

Southern California Edison Co.'s recently completed frequency change program won one of three honorable mentions in this year's competition for the Coffin Award. Edison Electric Institute gave the award for "distinguished contribution during the year 1948 to the development of electric light and power for the convenience of the public and the benefit of the industry."

First place winner was the Union Electric Co. of Missouri, on the basis of the outstanding results achieved by its community relations program last year. Other utilities receiving honorable mention certificates were the Detroit Edison Co. and the Cincinnati Gas and Electric Co. Finalists in the competition were chosen from a list of 25 companies, representing every section of the nation, which had originally been nominated to compete.

The annual award, consisting of a gold medal and $1,000 in cash, was established by the General Electric Co. as a memorial to the late Mr. Coffin, the firm's founder and first president. It is administered by the Edison Electric Institute and cites specific accomplishments rather than general excellence; it may be given for important advances in any area of operations.

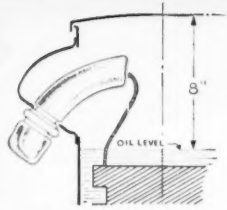
The winner was chosen by a selection committee consisting of Dr. James R. Killian, president of Massachusetts Institute of Technology; Ernest R. Acker, Poughkeepsie, N. Y., EEI president, and C. W. Kellogg, Queen Anne, Md., past president of EEI.

● B. C. Electric Railway Co. is planning a $7,000,000 hydroelectric development at Jones Lake, nine miles east of Rosedale in the Fraser Valley area. A. E. Grauer, president of the B. C. Electric, stated the survey was designed to provide future "peaking capacity" to the company's generating facilities at Bridge River and at other points in the Lower Mainland. He stated construction would be commenced as soon as the Lower Mainland of British Columbia warranted the building of a new generating plant.

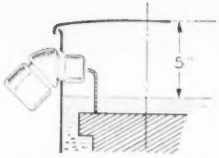
● Superintendent E. R. Hoffman of Seattle City Light has asked the city council to approve a $1,219,000 appropriation for improving and expanding substation facilities within the city. Four 6,000-kva. units would be installed in one substation to handle alternating current while two 1,500-kw. and four 1,000-kw. units would be installed in three other substations handling direct current. Two 300-kw. units in another substation would be moved.

NOW...

- Tank Height Reduced!
- Bushing Pockets Eliminated!
- Bushing Clamp Simplified!



OLD DESIGN required more space above oil level because of longer bushing shank.



NEW BUSHING saves up to 3" in tank height . . . eliminates need for bushing pockets.

EXPLODED VIEW shows the simplicity of the new bushing clamping arrangement.

A-2704

. . . on Allis-Chalmers Distribution Transformers

ALLIS-CHALMERS NEW TANK-WALL BUSHING eliminates all need for high voltage bushing pockets . . . enables up to 3" reductions in tank height. This means even greater compactness . . . easier handling distribution transformers than ever before! (Reductions are *in addition* to savings in size and weight through use of highly oriented core steel.)

Installation of the bushing itself is simplified because there are fewer parts, and no critical porcelain tolerances between bushing and keeper. A cushion-like spring on the inner side of the tank wall, between the keeper and bushing absorbs any shock or strain during handling. Increased wall thickness of the bushing, together with straighter, shorter shank contour, increases mechanical strength.

AVAILABLE ON UNITS UP TO 150 KVA

The new design is available on transformers from 3 to 100 kva, single phase, and from 9 to 150 kva, three phase, in voltages up to 4800/8320Y.

For further details on this new bushing, or for other facts on Allis-Chalmers quality distribution transformers, call your nearby A-C sales representative.

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

NEWS ABOUT PEOPLE

● PAUL E. CHAPMAN, San Francisco division electric superintendent of Pacific Gas and Electric Co., retired on July 1. A native of Napa, Calif., and a graduate of the University of California, he had been with the company since 1910. His first job was the organization of an office to direct electric distribution. From 1930 until his retirement he directed the operation of all PG and E generating plants and other electric facilities in San Francisco.

● FREDERIC J. SOUTHERLAND, assistant in the office of the vice-president in charge of sales, Pacific Gas and Electric Co., retired recently. Southerland has the distinction of having come West especially to help rebuild San Francisco after the 1906 earthquake. He was aboard a Hudson River ferry boat when he saw a newspaper headline, *San Francisco in Ruins*, and immediately decided to resign from the New York Edison Co. to go to the stricken city. With the exception of service as an officer in both world wars he had been with PG and E since 1910.

● IN CONNECTION with the reorganization of the sales department of Central Arizona Light & Power Co., Don Willis, general sales manager, has announced the following personnel changes: ALBERT W. SMITH, former manager of the residential and small commercial sales section, has been appointed manager of the sales promotion and advertising section of the general sales department; L. H. SHAFF, previously manager of the company's Wickenburg district, is now manager of the residential and small commercial sales section, replacing Smith; ROBERT W. FIELD, former central division dealer sales coordinator, has been named manager of the central division sales section, filling the vacancy caused by the death of Reg S. Phillips; AL TUDOR has been promoted from editor of the company's employee publication to director of publicity and advertising copy.

● JOHN MENZ has been named sales manager for the electrical conductor division of Permanente Products Co., Oakland. In his new position Menz will have charge of sales of all wire and cable manufactured at the company's recently acquired plant at Newark, Ohio. His chief assistant will be Edmond S. McConnell, sales engineer.

● N. H. MARTIN, electrical sales supervisor, and E. W. KEMOE, tours supervisor and statistician, recently completed 40 years of service with Seattle City Light. Both started as clerks, Martin having managed several branches before reaching his present position. Kemoe started the City Light tours to the system's hydroelectric project on the Skagit River.

● JOHN HOOD has retired as manager of the Oakland Works of General Electric Co.'s apparatus department. He has been with G-E since 1910. He will be succeeded by AB MARTIN, assistant manager for the past year. Martin joined the company in 1929.

● C. P. ALTLAND has been advanced from assistant manager of purchases for Southern California Edison Co. to manager of purchases, succeeding the late F. F. Henry. Altland has been associated with the utility since 1919.

● ROLAND R. BLANTZ has been promoted from general line foreman of Portland General Electric Co.'s Oregon City division to safety engineer. In his new position Blantz will be responsible for accident prevention activities on the company's system.

NOTES ON THE TRADE

● GEORGE R. SOMMERS, director of sales on the Pacific Coast for Sylvania Electric Products Inc., has been transferred to Sylvania's home office in New York City. He will work in the radio tube division on special assignments as assistant to the general sales manager. Sommers came to San Francisco from Washington, D. C., in 1945 as Pacific Coast sales manager of the lighting division. In 1948 he was promoted to director of sales on the Pacific Coast. Concurrent with his promotion Sommers announced the appointment of Garlan Morse of Salem, Mass., who will replace him as director of sales on the Pacific Coast. For the past five years Morse has served as merchandising manager in the lighting division of Sylvania.

● MCGRAW ELECTRIC CO. of Elgin, Ill., has acquired control of Line Material Co. of Milwaukee, according to announcement by Max McGraw and W. D. Kyle Jr., presidents of the two firms. Line Material Co. stockholders will be given representation on the board of directors of McGraw Electric Co. and W. D. Kyle Jr. will remain as president and general manager of the Line Material company or division. Max McGraw becomes chairman of the board of Line Material, replacing W. D. Kyle Sr., who will serve in an advisory capacity.

● KEN SCHUMANN, Denver, and BILL SANDERLINE JR., Seattle, were among the RACO agents who attended the convention of the National Electrical Wholesalers Assn. at Cincinnati recently. RACO agents and home office personnel were later honored at a banquet held by All-Steel Equipment Inc.

Shaff Field Smith Tudor

Put more opportunity into your company's future

WITH THIS FIVE-STEP PROGRAM

Here's an easy-to-follow program that will substantially increase your company's chances for a prosperous future.

Nation-wide experience in 20,000 companies proves that this popular program also pays off handsomely *today*. It increases each participating employee's peace of mind—making him a more contented, more productive worker. It reduces absenteeism, lowers accident rates, increases output, and improves employee-employer relations!

This program is simply a proved formula for building membership in the Payroll Savings Plan—the "automatic" system by which millions of workers are investing in U. S. Savings Bonds every pay-day.

What Are the Five Steps?

The benefits of the Payroll Savings Plan to your company are in proportion to the percentage of employees who participate. Nation-wide experience indicates that 50% of your employees can be persuaded to join *without high-pressure selling*. Here are five steps which have proved to be the "magic formula" for putting over the Plan. They will get results for you:

1. See that a top management man sponsors the Plan.
2. Secure the help of the employee organizations in promoting it.
3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.
4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Check up on the Payroll Savings Plan in your company. If fewer than half of your employees are participating, you have a lot to gain by following the five-step program outlined here. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bond Division. While it's on your mind, why not call him right now? Or write the Treasury Department, Washington 25, D. C.

Are You With It?

In the current national Savings Bonds campaign, May 16-June 30, the Treasury Department asks each company operating the Payroll Savings Plan to canvass all employees, with the goal of having at least half of them signed up by the end of the month. This advertisement tells how you can achieve that goal most easily.

The Treasury Department acknowledges with appreciation the publication of this message by

ELECTRICAL WEST

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

ADVERTISING INDEX

July 1949

Allen-Bradley 33, 34
Allis-Chalmers Mfg. Co. 13, 42, 43, 55, 125
Anaconda Wire & Cable Co. 41
Appleton Electric Co. 113

Briegel Method Tool Co. 10
BullDog Electric Products Co. 29

Classified 115, 118
Cole Electric Company 109
Crescent Insulated Wire & Cable 107
Crouse-Hinds Company 110
Curtis Lighting, Inc. 117

Electric Equipment Company 118
Electrical Specialty Co. 118
Essex Wire Corporation 50

Fedders-Quigan Corp. 27

Gardner Electric Mfg. Co. 115
General Electric Co.:
Bridgeport, Construction Div. 21, 39, 121
Schenectady, Apparatus Div. 1, 16, 17, 25, 47, 99
Syracuse, Electronics Div. 32
General Electric Supply Corp. 6
General Switch Corp. 105

Helwig Company 48
Honn Co., George E. 123

Ilsco Copper Tube & Products Co. 123
Indiana Steel & Wire 122
Industrial Electronics Corp. 48

Jeffries Transformer Co. 122

Kearney Corp., James R. 56
Kulka Electric Mfg. Corp. 46

Line Material Company 3, 22, 23
Locke, Inc. 18

Marcus Transformer 44
McGraw-Hill Book Co. 122
Meter Devices 46
Moloney Electric Company 8, 9
Multi Products Mfg. Co. 52
Murray Mfg. Corp. 49

National Electric Products Corp. 11
National Varnished Products Corp. 15

Ohio Brass Co. 53
Ohio Carbon Co. 114
Okonite Company 4
Orangeburg Mfg. Co., Inc. 30

Pacific Coast Elec'l Association 4th Cover
Pacific Gas and Electric Co. 3rd Cover
Penn-Union Electric Corp. 45
Permanente Metals Corp. 14
Porcelain Products, Inc. 38
Pyle-National Co. 40

Rome Cable Corp. 19

Sangamo Electric Co. 12
Shell Oil Company 7
Simplex Wire & Cable Co. 28
Smoot-Holman Co. 35
Southern California Edison Co. 2nd Cover
Square D Company 24
Standard Oil Company 51
Sunbeam Lighting Company 31

Tork Clock Co., Inc. 50
Triangle Conduit & Cable Co. 26
Tri-State Supply Corp. 119

U. S. Rubber Co. 101

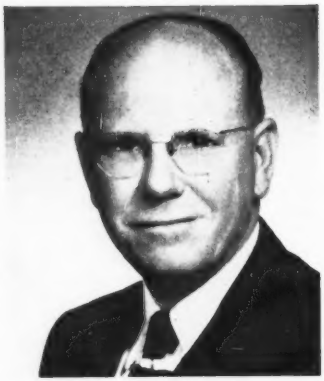
Wagner Electric Corp. 20
Wagner Malleable Products Co. 118
Westinghouse Electric Corp.:
Bloomfield, Lamp Dept. 103
Pittsburgh, Apparatus 5, 36, 37

PROFILES

L. R. Patterson, above left, has been named superintendent, electric system planning by Public Service, Colorado

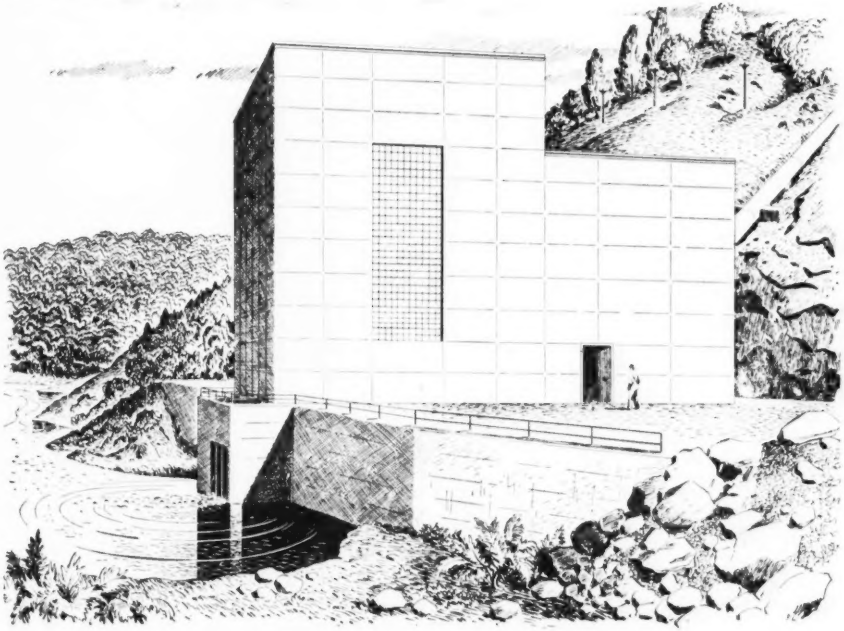
Thomas J. Gamble, above right, was made secretary of So. Calif. Edison, replacing O. V. Showers, who retired May 31. He had been assistant secretary of the company before promotion

Walter F. Chapman, right, who has been with San Diego Gas & Electric in various jobs since 1922, has been appointed commercial manager. Prior to his promotion, he was serving as superintendent of customer extensions. He succeeds H. G. Dillin, now vice-president in charge of sales activity



Relaxing as the PCEA convention ended with a banquet, hard workers Don Turner, Les Kobler and Paul Corriere and their wives. Stage arrangements were under Kobler's direction; ladies' entertainment headed by Corriere, Coronado

Another P. G. and E. power-producer on the line



Colgate is fifth plant added to the system in thirteen months

There's new power pouring from the Yuba River today... 40,200 horsepower. A few days ago the tumbling Yuba waters began spinning the generator in P.G. and E.'s new Colgate plant built to replace the pioneer Colgate unit that first supplied Oakland with electricity half a century ago. Colgate is just one of the many powerhouses ...completed or building...in P. G. and E.'s postwar expansion program, which is adding nearly two million horsepower in new generating capacity to our system. In the past thirteen months alone this program has paid big power dividends... a total of almost 600,000 horsepower from five new major plants. In addition to Colgate, they are:

Kern Steam Plant, near Bakersfield, began turning out 101,000 horsepower for California in May, 1948.

Electra Powerhouse, on the Mokelumne River, 133,000 horsepower, came on the line in July, 1948.

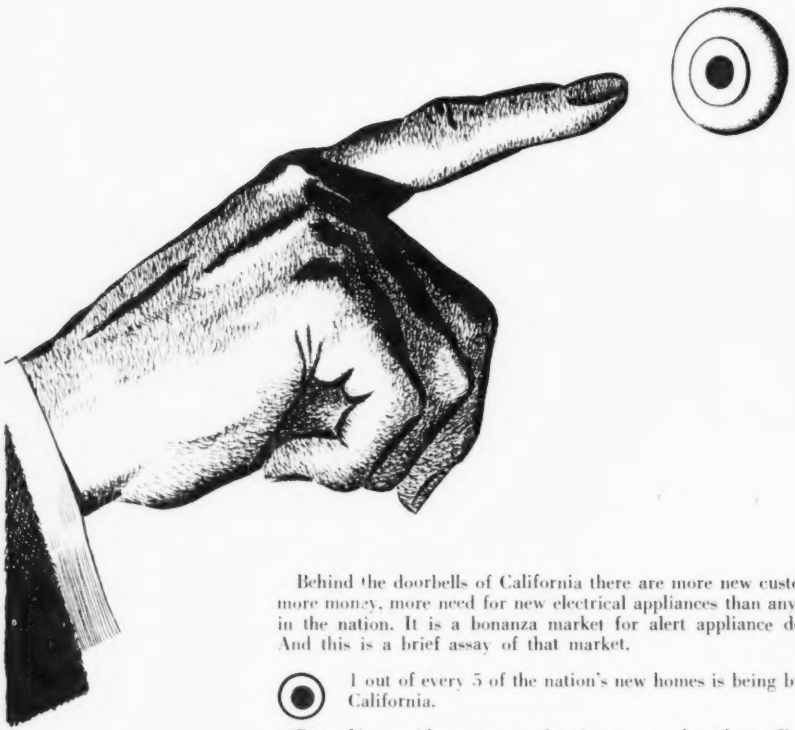
West Point Powerhouse, also on the Mokelumne, added another 21,000 horsepower in November, 1948.

Station "P," the steam giant by San Francisco Bay added 298,000 horsepower in February, 1949.

P · G · and E · PACIFIC GAS AND ELECTRIC COMPANY

EW 107-749

It is TIME to Ring the Bell and SELL



Behind the doorbells of California there are more new customers, more money, more need for new electrical appliances than anywhere in the nation. It is a bonanza market for alert appliance dealers. And this is a brief assay of that market.

- 1 out of every 5 of the nation's new homes is being built in California.
- New residents are pouring in at a steady volume. Employment and per capita income are the highest in the nation.
- Personal savings—in time deposits alone, are at least 5 billion dollars and are growing at the rate of 9 per cent a year—three times faster than the normal rate.
- There is a tremendous backlog of old appliances that need replacing. 49 per cent of the refrigerators in the State are 7 years old. 45 per cent of the electric ranges are from 7 to 20 years old. 52 per cent of the electric water heaters are more than 7 years old.
- Less than 10 per cent of the market has been sold on home freezers, automatic washing machines and clothes dryers.

Planned promotional programs are at work in this market for you who sell appliances. But you will have to ring the bell to open the door to sell the prospects.

PACIFIC COAST ELECTRICAL ASSOCIATION

447 SUTTER STREET, SAN FRANCISCO 8, CALIFORNIA • 601 W. FIFTH STREET, LOS ANGELES 13, CALIFORNIA